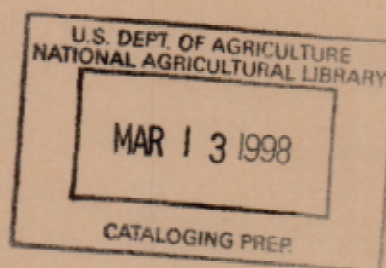


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AGRICULTURAL ECONOMIC REPORT NO. 154

# **SUPPLYING U.S. MARKETS WITH FRESH WINTER PRODUCE**

Capabilities of U.S. and  
Mexican Production Areas



A Study Performed in Response to Congressional Inquiry  
by the Economic Research Service with the Cooperation  
of the Foreign Agricultural Service

U.S. DEPARTMENT OF AGRICULTURE

## ACKNOWLEDGMENTS

Many individuals and groups contributed to the study. To enumerate them all would be impossible.

Producers, both in the United States and Mexico, graciously furnished detailed information about their production and marketing practices and costs. The Cooperative Extension Service and its county agricultural agents in Florida, California, and Texas helped greatly with information about costs and marketing and in contacting growers and marketing firms.

In Mexico, the Union Nacional de Productores de Hortalizas (National Union of Horticultural Producers) and its member state and local associations gave full support to the project. They also provided support personnel to help contact farmers and assist the survey team, including interpreting. Much background information was gathered from these agencies.

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The Foreign Agricultural Service co-sponsored the project, and the U.S. Agricultural Attache at Mexico City and the U.S. Consul in Merida provided important support activities and facilitated the contacting of appropriate groups to arrange for interviews with Mexican producers.

Joseph C. Podany and Harold T. Yee, Marketing Economics Division, conducted some of the field work and preliminary analyses of parts of the marketing phase of the study.

The contribution of all the foregoing persons and groups is gratefully acknowledged.

While many have made vital contributions, the responsibility for all presentations belongs to the survey team which has made every effort to provide reliable information and impartial conclusions.

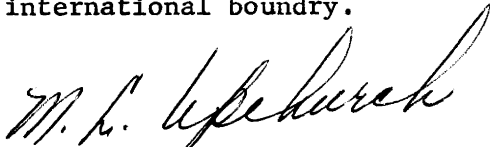
## FOREWORD

Economic Research Service has long been occupied with problems of inter-regional adjustments in U.S. agriculture. The interregional adjustments that result from the efforts of large numbers of producers shifting resources among enterprises in pursuit of the highest income attainable tend to follow the economic principle of comparative advantage.

It is inevitable that systematic study of the workings of comparative advantage should be applied increasingly to competition across international boundaries. Such competition exists in U.S. markets for fresh vegetables and fruits which, from December through May, are supplied partly by Mexico. This report gives the results of a study of interregional competition in the production and marketing of the six principal winter vegetables and fruits.

Many, if not most, economic problems in agriculture may be classified usefully as problems of production or marketing, or as domestic or foreign problems. Economic research methodology, the training and experience of research workers, and the organization of agricultural economic research agencies all reflect such classifications. The research approach to problems of international comparative advantage, however, tends to be unbalanced if bound by such distinctions.

To achieve a suitable balance in the present instance, the economists who carried out the study were drawn from three divisions of Economic Research Service: Farm Production Economics, Marketing Economics, and Foreign Development and Trade. They pooled their specialized training and experience to cover comprehensively the production, marketing, and international aspects of the winter vegetable industry. The results are a model of teamwork in research on a specific problem of international comparative advantage. The results should be useful to producers and policy makers on both sides of the international boundary.



M. L. UPCHURCH  
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## SUMMARY

Research on the international aspects of production and marketing of winter fruits and vegetables shows that Mexico--with an increase of imports from \$18,907,000 in 1956 to \$99,596,000 in 1967--has become an important source of fruits and vegetables for the United States. Traditionally, winter produce for the U.S. market came primarily from Florida, California, and Texas. Mexico, in recent years, has moved ahead of California and Texas as a major supplier of vegetables, and has the potential of becoming the dominant supplier.

Supplies of winter produce began to come to the United States from Mexico and the Caribbean area in the early 1900's. Prior to the 1950's, domestic producers apparently did not look upon these supplies as a threat. However, by the end of the 1950's, producers began to feel alarm over Mexico's growing share of the U.S. vegetable market. The loss of Cuba as a production base, termination of the special provisions of the Immigration and Nationality Act admitting foreign seasonal agricultural workers (bracero program), and development of transportation and irrigation facilities in western Mexico contributed to Mexico's growth as a supplier of winter produce. California and Texas had climate disadvantages which quickly forced them into minor positions as winter supply areas for certain types of produce after Mexico began to expand its output. The Florida vegetable industry began to feel pressure from Mexican imports around the mid-sixties.

Tomatoes are the most important item of winter produce imported from Mexico, comprising 71 percent of the value of all fresh vegetable imports. The cost of producing vine-ripe tomatoes in Mexico is about two-fifths that of Florida, although the ratio may be more or less for individual production inputs. Marketing costs for tomatoes from the farm in Mexico to shipping points on the U.S. side of the border are higher than from farm to shipping point in Florida, but the total cost delivered to Chicago is about even for both areas. Mexico has a slight cost advantage in delivering to markets in the western portion of the United States, and Florida has a slight advantage in delivering in the area from Chicago to the east coast. Given its advantage in cost of production and climate for winter production, Mexico will probably continue to increase its exports of vine-ripe tomatoes to the United States. Florida production of vine-ripe tomatoes during the winter season probably will continue to decline. Florida has dominated the market for mature-green tomatoes, and can be expected to retain a stronger competitive position for this type of tomato than for vine-ripened tomatoes.

Florida peppers and eggplant will remain in a strong competitive position in the near future in the central and eastern U.S. markets with Mexico increasing its supplies to the western markets.

Strawberry imports from Mexico during the winter will probably discourage expansion of the domestic industry.

Production of domestic cantaloups and cucumbers during the cold months is limited and offers little competition to imports.

SUPPLYING U.S. MARKETS WITH FRESH WINTER PRODUCE:  
CAPABILITIES OF U.S. AND MEXICAN PRODUCTION AREAS

BY

C. John Fliginger, Earle E. Gavett, Levi A. Powell, Sr., and Robert P. Jenkins<sup>1/</sup>

INTRODUCTION

The winter produce industry has always been accustomed to large capital requirements and a host of uncertainties about production and marketing outcomes. Few growers or marketing firms expect to come out ahead all the time. Occasional good seasons interspersed among the not-so-good are expected to keep the industry moving.

Among the uncertainties, for many years, was the level of imports of winter vegetables from Caribbean and Mexican sources. Domestic producers were not totally indifferent to these imports but they apparently did not begin to consider them a persistent threat until the late 1950's. Perhaps the concern was nominal because much of the imported produce was grown under the auspices of U.S. firms. Such arrangements were open to any growers who were venturesome enough to make them. Florida growers were attracted to establishment of operations in Cuba during the pre-Castro era for many of the same reasons that west coast producers were led to establishment of operations in Mexico.

A sequence of events beginning not long before and following the turn of the decade ultimately changed the attitude about imports from mild concern to genuine alarm. Producers in the lower west coast area and desert valley in California found themselves competing with supplies, particularly of tomatoes and cantaloups, from production bases that had been established in Mexico.

Florida growers were pushed out of Cuba and lost what, for practical purposes, had been considered a part of "home" output. Continuance of dual operations for some meant seeking less convenient offshore locations. Then, in 1964, the program ended under which seasonal laborers had entered the United States from Mexico, and new U.S. regulations restricted the use of offshore labor by Florida growers.

California growers protested the competition from Mexico as early as 1960. Alleged widespread heavy losses in the mid-1960's, (aggravated by rising costs and

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a sharp upturn in tomato imports from Mexico) then led to vigorous protests from south Florida also. These objections culminated in the introduction of several bills in Congress to limit imports of fresh fruits and vegetables into the United States.

For a better grasp of the factors behind current trends in imports and domestic production, the Economic Research Service studied the economic capabilities of competing domestic and Mexican production areas for furnishing U.S. markets with certain fresh produce, primarily tomatoes, cantaloups, and strawberries. This is a report summarizing what was learned in the study.

## CHARACTERISTICS OF WINTER VEGETABLE SUPPLY AREAS AND SOURCE

### Sources and Seasonality of Winter Vegetable Supplies

In this report, the term "winter vegetables" refers to six crops harvested sometime between December and May. <sup>2/</sup> The timing and duration of the season and rates of flow during the season differ among crops. In appendix tables 9-14, the term "winter" in reference to crops conforms to definitions established by the Statistical Reporting Service of the U.S. Department of Agriculture.

Harvesting dates of most commodities fall within certain periods which may coincide in Mexico and the United States. Seasonal patterns for the winter season 1966/67 are presented in figures 3-10 of appendix II; patterns for this season were not necessarily normal. Mexican shipments of tomatoes reach their peak in February. In February 1967, they almost equaled Florida shipments (app. fig. 3). In 1967, supplies from Florida increased rapidly during March, April, and May and Mexican shipments declined slightly. Shipments for both areas dropped off sharply in June.

Mexican shipment of cantaloups begin earlier than those of the United States, but peak at nearly the same time. In 1967, both United States and Mexican supplies peaked during May (app. fig. 4).

Domestic cucumbers in 1967 reached a low volume point during February and March. During the same time, supplies from Mexico reached their peak levels. Mexican shipments dropped off sharply when Florida production began increasing during April and May (app. fig. 5).

Rising demand for tomatoes and salad-type vegetables for fresh consumption in the United States has increased the importance of supplies during the winter months. The rising demand is the result of population increases which have more than offset declines in per capita consumption since 1945. Improved transportation facilities and greater consumer affluence have contributed to the increased

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<sup>2/</sup> Tomatoes, cucumbers, cantaloup, green peppers, strawberries, and eggplant. There are other crops harvested between December and May, but they are less important and were not included in the study.

demand for fresh vegetables during the cold months. Winter-season marketings of tomatoes, per capita, rose steadily from 1963/64 through 1966/67. Retail prices of loose tomatoes in New York City during the winter season 1967/68 averaged 19 percent higher than in 1963/64 (app. table 70). The Consumer Price Index by comparison, increased 12 percent from 1964 to 1968.

Winter supplies of the six commodities included in the study have been increasing in the United States since 1956 (app. tables 9-14). Domestic winter production has come from limited areas, primarily in Florida, California, and Texas, in contrast to the wide dispersion of areas producing summer supplies. Florida dominates the domestic cold-month production of the crops studied, with the exception of strawberries and cantaloup; California dominates the early strawberry production; and Arizona leads in early cantaloup production (app. tables 9-14).

Mexico also is a major supplier of fresh vegetables to the United States during cold weather months. Mexico's production has increased steadily since the 1950's with the rate of increase becoming more pronounced after 1960. In 1967, Mexico provided over one-third of the tomatoes and cucumbers, one-fourth of the cantaloup, one-sixth of the green peppers, one-fifth of the eggplant, and one-tenth of the strawberries available to U.S. consumers during the winter producing months. Mexico ranked second to Florida in shipments of all crops except cantaloup and strawberries.

Tomatoes are by far the most important crop studied. The other crops in order of importance, are green peppers, cucumbers, strawberries, eggplant, and cantaloups.

Domestic production of the 1967/68 winter and early spring tomato crops was valued at \$62.6 million. Winter, early spring, and spring strawberries ranked second with a total value of \$52.7 million. Imports of tomatoes from Mexico during 1967 totaled \$42.6 million, almost seven times greater than cantaloups, which ranked second in import value (app. table 17). In 1966, when the value of tomato imports from Mexico was at its peak, Mexican tomatoes accounted for nearly half of all U.S. imports of fruits and vegetables from Mexico (app. tables 16-17).

### Characteristics of Supply Areas

The domestic winter supply areas developed a high degree of specialization and a high level of investment in the years preceding the recent upsurge of Mexican supplies. To determine the competitive positions of the respective areas, it is important to understand some of their general characteristics.

#### Florida

Florida ranks second in total vegetable production in the United States, following California, which produces about twice as much in terms of total value. Florida, however, has a winter climate advantage for producing certain vegetables within the United States and leads in the production of winter crops.

Tomatoes are by far the most important vegetable produced in Florida, and accounted for a value of \$75,326,000 in the 1966/67 crop year, or 35 percent of the total value of all vegetables produced in the State. Acreage of tomatoes in the State increased generally from a low of 41,300 acres harvested during the 1960/61 crop year to a high of 51,400 in the 1965/66 crop year. The 1966/67 acreage harvested dropped 46,600 acres. Winter production accounted for 38 percent of the acreage and 37 percent of the value of the total tomato production in the 1966/67 crop year.

The largest production area is in the southeastern part of the State where 22,400 acres of tomatoes were harvested in the 1966/67 season. The area in the eastern part of Palm Beach County had the largest acreage of vine-ripe tomatoes in the area, followed by Broward County. Although southwestern Florida is second in terms of total tomato acreage, it is the leading producer of vine-ripe tomatoes. Collier County alone had 2,450 acres of the State's total vine-ripe acreage of 6,570 acres in 1966/67 season (app. fig. 8). All crops are grown under irrigation.

### California

Production in California of the winter vegetables covered in the study has declined to relative insignificance (app. tables 9-14). Most of the production is in the desert valleys and lower coastal areas.

Large areas of land with surface irrigation facilities are available, but cold winter temperatures prevent most growers from profitably producing mid-winter crops. High labor costs further contribute to the problem of winter vegetable cultivation and harvest. Growers are shifting to crops more adapted to California temperatures.

### Texas

In Texas, as in California, weather eliminates the State as a major winter vegetable producer (app. tables 9-14). Frequent freezes and generally cold weather severely handicap attempts to grow vegetable crops in Texas, except cantaloup, for harvest before the end of April. Shippers looking for more reliable and long-range supply sources have drifted away from the Texas lower Rio Grande Valley. Tomato producers in recent years have had difficulty finding buyers for their production even though they have been growing only about one-tenth as much as they did in the midfifties. With reduced buyer activity, producers generally receive a lower price, and some of the product remains unsold.

Adequate land is generally available for cultivation, and water sources although somewhat saline, are adequate. Farms in Texas are generally more diversified than in Florida or California, with few specializing in a particular crop.

### Mexico

In Mexico, five States accounted for more than 90 percent of the exports of vegetables and fresh fruit in the 1966/67 season (app. table 15). The most

important producing State is Sinaloa, which accounts for two-thirds of the vegetable and melon production. Michoacan ranks second and is important because of the strawberry and cantaloup production. Guanajuato is also an important producer of strawberries. Sonora and Baja California complete the five leading States; Yucatan also produces significant quantities of winter vegetables (app. figs. 9, 10).

Most of the crops grown in these areas are harvested during the period January through June. Shipments of the produce from these areas enter the United States through Nogales, Arizona; Laredo and McAllen, Texas; and Key West, Florida.

Most of the exports from these Mexican production areas are shipped to the United States. However, a significant portion go to Canada and lesser amounts to Europe and to other Latin American countries.

Tomatoes, the leading crop entering the United States, accounted for 71 percent of the total value of all vegetables imported from Mexico in 1967 (app. tables 16, 17). Sinaloa produced 89 percent of Mexico's tomatoes in 1967.

#### Mexico's West Coast

The Mexican West Coast production area, consisting primarily of Sinaloa and Sonora, lies directly south of Nogales, Arizona. Significant changes occurred in these States beginning in the midfifties, when large investments were made in irrigation facilities. During the same period, pavement of the west coast highway was completed and the railway was modernized. These facilities along with a warm climate resulted in a concentration of the production area around Culiacan (app. fig. 9). Areas to the north of Culiacan failed to develop because a cooler climate and occasional frosts there restrict development of vegetable plants.

Eleven rivers cross the State of Sinaloa providing water for 18 existing or proposed dams. Three completed dams provide irrigation water for 415,000 hectares (1,025,465 acres) of land. Another dam, under construction, will supply water for 82,000 hectares (202,622 acres). The rest of the proposed dams will provide water for 215,000 hectares (531,265 acres). Underground water provides irrigation for an additional 80,000 hectares (197,680 acres). A grand total of 792,000 hectares (1,957,032 acres) will be irrigated in the State of Sinaloa when all projects are completed (app. fig. 9).

More than 30 crops are raised in Sinaloa, including citrus, vegetables, oilseeds, cotton, sugarcane, melons, and fruit.

Vegetable crops produced for export include asparagus, cabbage, cantaloup, cauliflower, cucumbers, eggplant, garlic, green beans, peas, peppers, squash, strawberries, tomatoes, and watermelon. These crops are all grown under irrigation and exported through Nogales, Arizona. The total vegetable producing area increased from 18,188 hectares (44,943 acres) in the 1965/66 season to 22,518 hectares (55,642 acres) in the 1966/67 season. About half was devoted to tomatoes, which accounted for around 60 percent of the total value of vegetable exports.

The Mexican vegetable industry developed largely as a result of investments from U.S. sources. Production credit from Mexican sources is limited. When local money is available, interest runs around 12 percent. Many growers have obtained credit by associating with a broker or producer-handler from the United States. The broker advances money to the producer for production expenses, then takes the advance out of the proceeds from the sale of the produce. Some U.S. growers are involved with Mexican production. Most of these arrangements take the form of partnerships, since Mexico does not permit foreign nationals to own land within 50 kilometers (32 miles) of a coastline or 100 kilometers (64 miles) of an international boundary without special arrangements. Precise data on the extent to which producers in the Sinaloa area are dependent on U.S. firms are not available, but these producers are apparently becoming less so than in the past (p. 24).

Mexican producers have rapidly developed a high degree of competence in crop technology and advanced integration in the production, packing, and selling segments of the operation.

Advances in crop production techniques are demonstrated by increased use of fertilizers and insecticides in recent years. Further increases are projected for the future (app. tables 18,19). The use of modern machinery has also increased (app. tables 20,21). Sophistication is also demonstrated by the organization and support of the producer associations.

Most growers use much machinery and modern methods of cultivation, fertilization, insect control, and packing. However, large numbers of hand laborers are needed for producing, harvesting, and packing most vegetables. The labor force in the west coast area is expected to grow at an annual rate of 1.7 percent a year to 1975 (app. table 23). This growth coupled with the high degree of mechanization of producers and packers suggests that shortage of labor will not be a restrictive factor in the near future.

### Zamora and Irapuato

The irrigated areas of the States of Guanajuato, Michoacan, and Jalisco are Mexico's principal suppliers of strawberries. Guanajuato and Michoacan contribute over 90 percent of the country's production. The area known as the "Bajio" located between Irapuato, Zamora, and Morelia, is the most important of the strawberry areas. Production around Zamora has increased rapidly. In 1967, Zamora exported about half as many fresh strawberries as Irapuato.

The Bajio is located west of Mexico City and ranges from 5,000 to 8,000 feet above sea level. Strawberries are grown on the lower elevations. Both underground and surface waters are used for irrigation in Guanajuato. Mineral content of the water is high, but in spite of this, growers have continued to increase yields. The Zamora area relies more on surface water although there are several pump systems. The water is much lower in mineral content.

Fresh strawberries contributed over \$3 million to Mexico's \$100 million worth of exports of fruits and vegetables in 1967. Exports of fresh berries began in 1958, when 4,000 pounds were shipped to the United States. By 1967,

more than 20 million pounds were sold in the United States. Growth in the domestic market has also contributed to the importance of strawberry production. Production increased mainly as a result of larger acreage, but also of higher yields.

Other vegetables (such as broccoli and asparagus for freezing) as well as field crops (such as wheat, corn, and alfalfa) are produced in these areas. Because of the relatively large acreages of low income crops which are currently being produced, there is a large expansion potential for strawberries and vegetable crops. Some berries are shipped by air out of Mexico City and Monterrey. A new jet airport has recently been completed at Guadalajara. However, most of the strawberry crop moves by truck, crossing into the United States at Laredo or McAllen, Texas. During and after the fresh market harvest, many strawberries are frozen. In 1967, frozen strawberries accounted for 79 percent of the total fresh and frozen strawberry tonnage imported to the United States from Mexico. Processed vegetables are becoming increasingly important as growers begin to develop other crops to utilize freezing and canning facilities when strawberries are not being processed. Asparagus is the most important of the other crops. As production of these crops increases, it is expected that at least a portion of them will be exported fresh.

#### Apatzingan

Apatzingan, the center of the early cantaloup area, is located near the Pacific coast, about halfway between Mexico City and Guadalajara. Cantaloups are the most important export vegetable crop. They are harvested from January to April. Shipments usually stop when the Bamoa area of the State of Sinaloa comes into production.

Acreage has remained rather stable in recent years, and yields have not appreciably improved. From a winter vegetable production standpoint, this area holds less promise. The land is rocky, hilly, and more difficult to irrigate than the Bajio, the Culiacan, or the Yucatan areas. It is also quite isolated, being connected with the rest of the country only by a tortuous mountain road and a railroad.

Most of the farms are relatively small as most growers are on "ejido" lands (discussed in more detail in a later section).

Other crops exported from the area include onions, watermelons, and cucumbers. The cucumbers are shipped fresh, but are produced primarily as a "pickle cuke" and are processed after being brought into the United States.

#### Yucatan

There is considerable interest in developing the State of Yucatan as an export vegetable producer. Both the State and Federal Governments have encouraged improvements of the local economy by these means. Until the 1967/68 season, experiments proved unsuccessful, and no large shipments were made from the area. Production is apparently no problem as several vegetable crops have been successfully grown. Most important of these are tomatoes, cucumbers, and eggplant. Early failures in marketing apparently resulted from a lack of financial resources and transportation difficulties.

The 1967/68 season brought at least a partial success to export production in the Yucatan. Construction of facilities and land clearing had been completed by public effort in earlier years. During 1967/68, a single Mexican producer with financial backing leased these facilities, as well as two ships. His was the only production being exported. Two shipments per week were made to Florida during the winter and early spring months. Problems encountered included holding the crop for a few days between shipping schedules, 40 hours of travel time between Yucatan and Key West, and repacking in Florida. These factors were disadvantageous for exporting tomatoes, but did not appreciably deter cucumber exports. Around 4,000 tons of produce were exported from the Yucatan during the 1967/68 season.

All of the crops are grown under irrigation with water from underground sources. As a result of the decline in the hemp industry in recent years, labor has been abundant, and has not been a limiting factor for expansion of the vegetable acreage. Large areas of land are available for clearing and potential production of vegetables.

### "Ejido" Land

Ejido land and producers are an important part of Mexican agriculture, and the ejido system has some effect on the production of winter produce. Ejido settlements are located on land which was expropriated from private owners. The ejido program was authorized by the constitution of 1917. Private properties in excess of specified limits, which vary depending on types of land, are subject to expropriation. Indian villages within a 4-mile radius of the expropriated property are eligible to occupy the land if sufficient need can be demonstrated.

The 1960 Mexican census of agriculture shows a total of 1,428,000 hectares of irrigated land in the hands of the ejido villages. This was 41 percent of the total irrigated land in Mexico as shown in the 1960 census of agriculture. This land is owned by the village and operated by members of that village. The terms on which land is available to the ejido producers tends to hold production operations to a smaller scale than on private holdings.

No systematic attempt was made in the study to evaluate the productivity of the ejidos, but it was quite evident that they operated with much less capital than private farms and as a result had lower yields. Since the ejido producer does not own his land, it is more difficult for him than for the private farmer to get production loans. Some limited amounts of credit are available from private sources at high rates. Other loans are available from ejido banks using public funds administered by the Federal Government.

In the West Coast areas, production of vegetables on ejido land apparently was not important. In the Zamora and Irapuato areas, ejido producers are significant in the production of strawberries. In the Apatzingan area, ejido producers are the main sources of cantaloup supplies; they play an important role in the marketing of their crop, and participate actively in the grower associations.

## General Area Comparisons

An analysis of direct costs of production and marketing will be discussed later in this report. However, many factors apart from direct costs greatly affect the ability of an area to compete.

Weather is a major factor in winter vegetable production. The west coast area of Mexico enjoys more favorable production weather than Florida. Within the west coast area, favorable weather is responsible for the centering of the major production area around Culiacan, where losses to cold were less than in the more northern areas of Guaymas and Los Mochis. Weather in South Florida gives producers an advantage over California and Texas because of more frequent midwinter freezes in the latter States.

Labor is also a major factor in vegetable production. Labor supplies in Mexico are essentially unlimited. Although shortages of labor were not reported as a major problem by U.S. producers, they did express concern over the poor quality of labor. Inefficient workers were a common concern within Mexican producers as well.

Minimum wage rates in the Mexican areas studied ran from 16 pesos (\$1.28) a day in the Yucatan to 26 pesos (\$2.10) a day in the west coast area of Mexico. Florida growers usually paid laborers more than the minimum level of \$1.15 an hour during the survey period.

A cost analysis of labor will be included in the sections concerning direct costs of production and marketing.

Mexican producers purchase much of their equipment from the United States. Difficulties of importing repair parts require that growers maintain a large inventory of parts or experience lengthy delays in obtaining the necessary parts from the United States through difficult and lengthy customs clearance. In contrast, U.S. producers have relatively easy and rapid access to parts without maintaining the large inventory.

Water supplies in most domestic and Mexican areas of production are adequate in both quantity and quality for increased production.

### Grower Associations

Grower associations play an important role in all supply areas and can have a significant influence on the development of an area. Most important of the associations affecting the U.S. supply of winter vegetables are the Florida Fruit and Vegetable Growers Association (FFVA) and National Union of Horticultural Producers and its affiliates in Mexico.

The FFVA is an organization of growers, packers, and shippers who have formed to do collectively what individuals cannot. The operations include education, research, labor, insurance, transportation, taxation, legislation, and public relations. Florida is divided into 12 regions with an association director in each. The FFVA is a nonprofit organization financed by growers who pay dues on an assessable part of their sales.

The Mexican association is a little more elaborate than the Florida association. It is a national association called the Union Nacional de Productores Horticolas (National Union of Horticultural Producers). Affiliated organizations are formed for the States, and within a given State local associations are formed. Probably the strongest state union in Mexico is CAADES (Confederation of Agricultural Associations of the State of Sinaloa).

Legal authority is granted by the Government through the national, state, and local associations to conduct programs of acreage control, export quality and quantity control, and other programs establishing policy and coordination of the industry.

The associations, working together, undertake some rather sophisticated analyses for determining acreage requirements and establishing quotas for individual growers. A published Mexican evaluation of production and marketing illustrates the basis for establishing acreage allotments (app. III).

The associations have formulated regulations for packing, shipping, crossing the border, and selling tomatoes. These regulations can be enforced by the associations with the cooperation of producers and authority from the Federal Government. Growers must get permits to export from the State or country. If a grower does not conform to the regulations, he may be denied export privileges, (app. IV).

Recommended acreages for planting are based on an analysis of market demand and what can be produced in an area. The association most active in the analysis work is CAADES. The local association apportions the allotments to individual growers, based on past performance and size of operation. Currently, the associations in Sinaloa are most active in making recommendations for acreage controls, but others such as the strawberry producers are considering adoption of restrictive policies.

These associations provide many other services as well. Some function as supply cooperatives procuring fertilizers and other materials for producers. They also provide market and exchange intelligence and promote sales programs for their members.

A major contribution of associations to growers has been to aid in collecting sales revenues, in cases of hard-to-collect debts. The associations also supervise the production, distribute certified seed, and perform marketing services.

The following chapters of this report will examine in more detail the nature of Mexican and U.S. production, marketing, and competition.

# INTERNATIONAL TRADE

The balance of trade between Mexico and the United States favored the United States by \$232 million in 1963. This favorable balance increased to \$465 million in 1967 (table 1). Because U.S. tourists spend more in Mexico than Mexican tourists spend in the United States, the travel balance between the two countries favors Mexico (table 2). In 1967, the trade and travel balance favored the United States by \$332 million compared with \$73 million in 1963 (table 2).

U.S. imports of agricultural products from Mexico increased from \$252 million in 1963 to \$327 million in 1967. Exports of U.S. agricultural products to Mexico declined during the same period from \$83 million in 1963 to \$70 million in 1967 (table 1). Vegetables for fresh consumption accounted for 12 percent of the agricultural commodities imported to the United States from Mexico in 1963 and 18 percent in 1967. Imports of tomatoes alone, at a value of \$21 million in 1963 and \$43 million in 1967, increased from 8 percent to 13 percent on the total value of agricultural products imported.

Table 1.--U.S. trade with Mexico

Year	U.S. exports to Mexico		U.S. imports from Mexico		Balance	
	Agri- cultural com- modities	All com- modities	Agri- cultural com- modities	All com- modities	Agri- cultural com- modities	All com- modities
-----Million dollars-----						
1963....	83	781	252	549	-169	232
1964....	75	1,026	292	607	-217	419
1965....	87	1,056	276	591	-189	465
1966....	74	1,131	328	705	-254	426
1967....	70	1,190	327	725	-257	465

Source: A supplement to the monthly U.S. Foreign Agricultural Trade by Countries (for calendar years 1964-68). Economic Research Service, U.S. Department of Agriculture.

Mexico's import policy is designed to encourage and protect domestic producers, encourage investment, and restrict the use of scarce foreign exchange to those imports considered essential. The most important means of control is through import licensing which controls the imports. Tariffs are another means of limiting imports but are considered to be less effective than licensing.

The United States also uses tariffs for agricultural products. In 1968, no quotas applied to the products studied. Table 3 sets forth the import duties of the crops studied.

Table 2.--U.S. trade and travel balance with Mexico, 1963-67

Year	U.S. residents' expenditures in Mexico	U.S. receipts from Mexican visitors, for travel in the United States	Travel balance	Trade balance	Trade and travel balance
-----Million dollars-----					
1963...	472	313	-159	232	73
1964...	490	342	-148	419	271
1965...	540	390	-150	465	315
1966...	575	458	-117	426	309
1967...	590	457	-133	465	332

Sources: Trade balance from table 1, expenditures and receipts from Etienne Miller, U.S. Spending for Foreign Travel Totaled \$4 3/4 billion in 1967 in Survey of Current Business, 48(6), June 1968.

Exports of vegetables by Mexico have made a significant contribution to the development of the country and to the 6.1 percent annual increase in Mexico's gross domestic product between 1961 and 1965.

Several U.S. industry groups and individuals believe that a more restrictive policy should be inaugurated in regard to import of Mexican vegetables. The proposals put forth have varied from import quotas to increased tariffs. Others have suggested that an amount equal to the import duty received be distributed among domestic U.S. producers to help combat the competition. Other groups feel that Mexico should lift present import restrictions from temperate climate crops and thus improve the overall balance of trade for agricultural products.

#### FACTORS AFFECTING PRODUCTION OF FRESH WINTER PRODUCE

A myriad of factors affect the location of production of fresh winter produce. Chief among these are climate, supply of hand labor, supply and quality of soil, water, and managerial resources, and the relative cost of production. Decisions of marketing firms also influence production decisions.

#### Differential Risk Due to Climate

The chief climatic factor during the winter produce season is temperature. Freezing weather may partially or completely destroy growing crops. Low temperatures may retard growth, fruit set, yield, and timing of harvest.

Relationships between temperature and yields and timing of production of tomatoes have been measured in research aimed at finding ways to minimize the effect of cold. Fruit set was found to be reduced by night temperatures of 50 to 55° F. (10-13° C.) or less, and nil when night temperatures ranged from

Table 3.--U.S. import duties on selected crops

Item	Duty per pound
	<u>Cents</u>
Vegetables:	
<u>Cucumbers:</u>	
If entered during the period from December 1 in any year to the last day of the following February, inclusive.....	2.2
If entered during the period from March 1 to June 30, inclusive, or the period from September 1 to November 30, inclusive, in any year.....	3.0
If entered during the period from July 1 to August 31, inclusive, in any year.....	1.5
<u>Eggplant:</u>	
If entered during the period from April 1 to November 30, inclusive, in any year.....	1.5
Other.....	1.1
<u>Peppers</u> .....	2.5
<u>Tomatoes:</u>	
If entered during the period from March 1 to July 14, inclusive, or the period from September 1 to November 14, inclusive, in any year.....	2.1
If entered during the period from July 15 to August 31, inclusive, in any year.....	1.5
If entered during the period from November 15, in any year, to the last day of the following February, inclusive:	1.5
Berries:	
<u>Strawberries:</u>	
If entered during the period from June 15 to September 15, inclusive, in any year.....	0.4
If entered at any other time.....	0.75
	<u>Ad valorem</u>
	<u>Percent</u>
Melons, fresh:	
<u>Cantaloups:</u>	
If entered during the period from August 1 to September 15, inclusive, in any year	20
If entered at any other time	35

Source: Tariff Schedules of the United States Annotated (1969), U.S. Tariff Commission. TC Pub. 272.

39 to 45° F. (4-5° C.). Studies have shown that the pollen tube grows more slowly at temperatures below 50° F. (10° C.) than at normal greenhouse temperatures, and this seems to explain the lower fruit set. Hormone sprays can offset some of the effect of low temperature. <sup>3/</sup> Use of hormones under field conditions appears impractical.

Timing of harvest may be delayed by several weeks after a spell of low night temperatures. In one study, the start of harvest was delayed 19 days by the difference between 72° and 52° F. (22° and 11° C.) in nighttime temperature. At the lower temperature, the midpoint of harvesting (when half the fruit was harvested) was delayed more than 6 weeks (fig. 1).

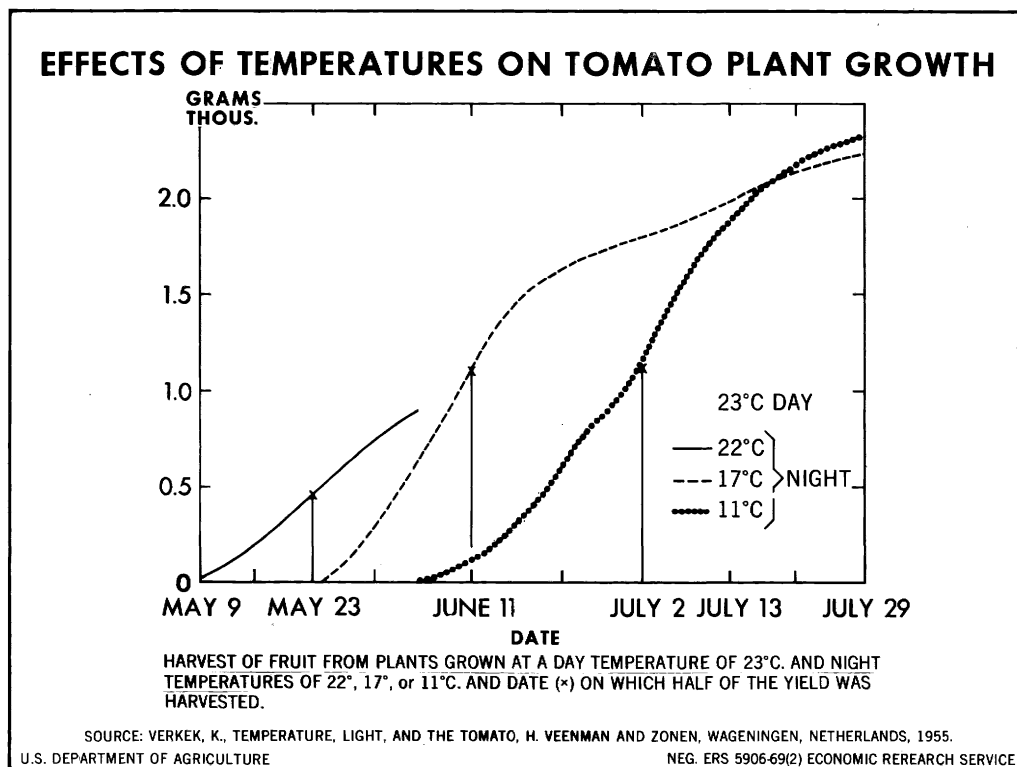


Figure 1

Similar data showing effects of temperature are not available for the other crops studied, but the effects are probably similar to those for tomatoes.

The possibility of obtaining sufficient domestic supplies of winter vegetables every year from California, Arizona, and Texas is severely limited by

<sup>3/</sup> Verkek, K., Temperature, Light, and the Tomato, H. Veenman and Zonen, Wageningen, Netherlands, 1955.

probability of freezing weather for substantial time periods in the lower Rio Grande Valley. In all three States, 50 percent probability of freezing weather lasts for 5 or more weeks in December and January (app. fig. 11). The freeze probability of 20 percent extends the restricted period another 5 to 6 weeks. Thus, at Rio Grande City, Texas, growers willing to accept only a 20-percent chance of freezing damage would have production restricted from about December 4 to March 11 (about 13 weeks). <sup>4/</sup>

Cold northern winds are frequent in the lower Rio Grande Valley of Texas bringing frosts to damage the tender vegetable crops. In some of the years when frosts do not occur, periods of cold weather reduce blossom set, delay growth, and generally make for low yields and high production cost per unit of product.

The practices required to guard against cold weather in Southern California are so expensive that for all practical purposes growers there have terminated winter vegetable production. It is not until late spring that the California growers can compete with Florida or Mexico in tomato production.

Climatic conditions are more favorable for certain areas of South Florida. Yet, producers there have not escaped all hazard of freezing weather. For example, in the Homestead, Florida, area, in 7 years out of 10, the temperature will reach 32° F. or below sometime during the December 10 to February 10 period. Similarly, in the Pompano area nearly 50 percent of the seasons will have some freezing weather between December 10 and February 10. In the Immokalee area, the probability of some freezing weather during that period is nearly two-thirds. Thus, the United States has no domestic areas that are free of the hazards of freeze damage during the winter (app. fig. 12). <sup>5/</sup> South Florida is the only domestic area where freezing temperatures occur in less than half of the years (app. figs. 13, 14).

Florida vegetable growers can expect to have temperatures below 40° F. every year. The probability of 36° F. varies from 80 to 95 percent in the three major areas (app. fig. 12). Hence, yields may be reduced and harvesting delayed for some plantings every year.

When Florida was providing a larger share of U.S. supplies of winter tomatoes, growers could expect higher prices to offset part of the loss in production brought on by vagaries of weather. The increasing supplies from Mexico have tended to even out the year-to-year variation in prices in the United States. There is correspondingly less probability that heavy supplies resulting from unexpectedly favorable weather in Florida will unduly depress the market. But it is likely that the effect of unstable weather on income of winter vegetable growers in Florida has been accentuated by the increased availability of supplies from Mexico. Industry leaders believe that the lessened chance of high-price years has been an important consideration leading a substantial number of producers to quit growing winter vegetables or to shift to Mexico and offshore areas of the Caribbean where the climate is more favorable.

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<sup>4/</sup> Haddock, Donald J., The Recurrent Threat of Cold to Crops in the Rio Grande Valley: An Interpretation of Weather Records, 1963 Journal of Rio Grande Valley Horticultural Society, vol. 17, pp. 178-184.

<sup>5/</sup> Weather Forecasting Mimeo, WEA 68-1, South Florida Weather Summary, Federal State Agricultural Weather Service, Lakeland, Florida.

The winter climate of certain areas of Mexico offers conditions far more suitable to the production of vegetables than any area in the United States.

The principal area producing winter vegetables is on the irrigated Coastal Plain near Culiacan in the State of Sinaloa. This area is frostfree throughout the winter. The Coastal Plain of Sinaloa had no temperatures 32° F. or lower in the 5 to 20 years of record. <sup>6/</sup> Tomatoes can also be grown farther south in Sinaloa, near Mazatlan, and farther north near Los Mochis, Sinaloa, and Guaymas, Sonora, but these other areas, both south and north have more cool winter weather than Culiacan. Culiacan has no frost, and seldom has rain during the winter production season. The Culiacan area has plenty of good soil, adequate irrigation and water facilities (being expanded rapidly), and adequate supply of seasonal labor at very low wage rates.

Vegetable-producing areas other than Culiacan have less desirable winter climates. Apatzingan has little or no probability of freezing weather, but rain and high humidity terminate the harvest of cantaloups in late spring leaving many unsalable melons in the field. Irapuato, being surrounded by mountains, also has frequent showers and occasional hail which is very destructive to the strawberries. Zamora has a better climate than Irapuato. However, these areas and the Yucatan area have little or no probability of freezing weather.

#### Soil and Water Resources

The winter vegetable production areas have a great variety of soils. In Florida, the Homestead area which is an important ground tomato and cucumber area has a calcareous rock marl which must be shaved by heavy rock plows and broken up by huge disks. Staking of a crop would be impossible on this soil. Water is provided by portable sprinkler trucks drawing from wells drilled every 2½ acres.

The Pompano area has predominately fine sandy loam. Crops can be readily staked, but end posts are required for heavy crops such as tomatoes.

The soils at Immokalee are of a coarse, sandy nature. Much of the area is virgin to row crop production, and producers often have to clear forests to obtain land not previously in tomatoes. In both areas, water is provided by pump irrigation from canals. Drainage is equally important and pumps are reversed during rainy weather.

Strawberry production in the Plant City area is also on sandy loam. Irrigation is often by sprinkler system with underground piping. Thus, the same land is used for strawberries year after year. Plant pests are controlled by fumigants rather than by rotation to "new" land.

Soils of the lower Rio Grande Valley of Texas range from a light, sandy loam near Rio Grande City to a heavy clay loam in the Harlingen area. Irrigation is by siphons from feeder canals.

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<sup>6/</sup> Mexican temperature data from Foreign Area Section, Environmental Data Service, Environmental Science Services Administration, U.S. Department of Commerce, Silver Spring, Md. 20910.

In the Imperial Valley of California soils range from sandy to heavy clay loam. Irrigation is by siphon from canals.

In Mexico, soils in the Culiacan area are generally of a heavy clay loam. Yet, some sandy areas do occur near the Gulf. The soil is deep and is irrigated by flooding from check dams or by siphon tubes. Salinity has become a problem, and growers rotate crops to prevent salt buildup that results from continuous cropping with high-water-using crops such as vegetables. Growers also leach the soil.

In Apatzingan, the topography is rolling and the soil is a very stony loam. Irrigation is by gated pipe at row ends.

Soils in the Irapuato area are heavy clay loams. The salinity buildup has reached such a level that strawberry yields have started to decline. Both the soil and the irrigation water are high in salt content and compound the problem. Water is obtained from streams and wells and distributed through canals to fields. At Zamora, the soil is a heavy clay loam with a low salt content. Water is obtained from impounded mountain streams and is of low salinity. Both siphon tubes and check dams are used to conduct water from ditches to the rows.

In all Mexican areas studied, excepting Apatzingan, soil and water resources are adequate for continued expansion of winter vegetable production. Furthermore, water resources on the West Coast of Mexico are expanding as a result of the vast hydroelectric program underway. Thus, much more arable land will be available for intensive cultivation in the near future.

Canals for distributing irrigation water to producers are often concrete lined with modern control equipment including water meters. The entire water storage and distribution system up to the field is built and maintained by the Government which levies a charge per hectare for water use.

### Labor Cost and Availability

The cost and availability of labor is the factor of greatest concern to U.S. producers in assessing Mexican competition. In spite of considerable mechanization, production of winter vegetables and strawberries still requires substantial amounts of hand labor. Over the years, Florida has been the winter home of a large number of migrants that travel along the Atlantic Coast harvesting crops as the season progresses. These migrants have been available to Florida producers during the winter season. The mechanization of some crops in the North has reduced the size of this migrant stream. In addition, recent increases in agricultural wage rates preclude use of certain marginal workers.

Increases in agricultural wage rates result, in part, from coverage of certain farmworkers by the Fair Labor Standards Act; and from "adverse-effect" wage rates established annually in each State by the Secretary of Labor under the temporary agricultural employment phase of the Immigration and Nationality Act of 1952. <sup>7/</sup>

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<sup>7/</sup> U.S. Department of Labor, Bureau of Employment Security, Farm Labor Developments, Aug. 1966.

The "adverse-effect" rate for Florida rose from \$0.95 per hour in 1962 to \$1.45 in 1968.

However, in 1966, 1967, and 1968, the Secretary of Labor determined and certified that there were sufficient domestic workers in the United States and denied use of foreign workers on vegetable farms in Florida.

There have been substantial adjustments in the Florida farm labor force since 1964. Sections of the southeastern coast of Florida are becoming more dependent upon resident and nearby labor forces. In Dade County, peak seasonal labor requirements occur in the January-March period. In 1964 and 1968, monthly employment for this period ran at 7,000 or more seasonal workers. The composition of the labor force in 1964 was about 40 percent local, 40 percent intrastate, and 20 percent interstate U.S. workers. (About two hundred foreign laborers made up about 3 percent of the labor force). By 1968, the composition had shifted to approximately 60 percent local, 30 percent intrastate, and 10 percent interstate, and no foreigners were employed (app. tables 25, 26).

Labor requirements for vegetable growing in the Lake Okeechobee-Palm Beach area cannot be determined readily from employment data for the region as the data include labor for the sugarcane industry and southern citrus industry as well as for vegetable growing. Moreover, labor needs for some crops, such as sweet corn and beans, are changing with the increasing use of mechanical harvesting.

For the January-March period in 1964, monthly employment of seasonal agricultural U.S. workers in the Lake Okeechobee area was 20,000 to 25,000. By 1968, employment had dropped to 15,000 or 16,000 workers per month and emphasis moved to the use of relatively more local workers. Roughly, 65 percent were local, 10 percent were intrastate, and 25 percent were interstate in 1964. The proportions changed to about 73 percent local, 7 percent intrastate, and 20 percent interstate in 1968 (app. tables 27, 28).

Growth and movement of a part of the vegetable industry to the lower west coast of Florida, an area including a large segment of the vine-ripe tomato acreage, has taxed the local labor market in that area. Only 3,000 or so workers, 80 to 90 percent of which were local, were needed per month to fill January-March requirements in 1964. The remaining few were about equally represented by intrastate and interstate workers. By the winter of 1968, monthly labor requirements had risen to around 10,000. While half of these were local, 25 percent had to be drawn from other areas in Florida and 25 percent obtained from out of state (app. tables 29, 30). Substantial numbers of migrants came from South Texas to work in Florida winter vegetables because there was little work for them in Texas during the winter season.

The availability of good harvesting labor is essential to most of the southern Florida vegetable industry, especially for tomatoes. Tomatoes require as much harvesting labor during winter months as all other vegetables together, except celery and snap beans, or around 40 percent of industry needs (app. table 31). Tomatoes must compete in the labor market with vegetables not facing competition from Mexico and at the same time must be sold in competition with Mexican tomatoes.

Before the minimum wage provision establishing the floor at \$1 per hour in 1967, piece rates had risen more than 50 percent in the Dade area and hourly rates in the Okeechobee area had risen from 65 cents an hour in the early sixties to about \$1 an hour in 1966. In the lower west coast area, 1966 rates were as high as \$1.50 per hour (app. tables 32-34). There were reports of field workers being paid wages above the \$1.15 minimum in 1968. Some were recorded in the study.

Labor legislation has had a substantial impact on the Florida vegetable labor market. In addition to field workers being covered by the Fair Labor Standards Act, the 1966 amendments to the FLSA also specified that agricultural processing employees (including all those engaged in transportation and preparation for transportation of fruits and vegetables from the farm to a place of first processing or first marketing within the same State) shall be paid wages of not less than \$1.40 per hour during the first year following date of enactment of the amendments and \$1.60 an hour thereafter.<sup>8/</sup> Some exceptions for newly covered workers apply, but by 1970 all such workers must be paid not less than \$1.60 per hour. Also, exemptions from overtime rates have been substantially reduced so that seasonal produce packing sheds may have to pay workers time and one-half for work in excess of 48 hours per week.

The pressure on the farm labor market is heightened by rising nonfarm wage rates. From January 1965 to October 1968, hourly earnings of nonfarm production workers in the Miami area rose from \$2.07 to \$2.42, a 17-percent increase. For the State of Florida, rates rose from \$2.13 to \$2.58 per hour, or 21 percent (app. table 35). The earnings differential between farm and nonfarm work exceeds \$1 per hour. Hence, whenever possible, farmhands leave the farm work force for better paying nonfarm employment opportunities.

The tightening farm labor situation has made labor intensive crops more risky and often less profitable than formerly, at given prices. All producers interviewed in Florida in 1968 reported that they were able to get sufficient workers to handle the acreage they were currently cultivating. In fact, a number indicated a surplus of workers available. However, nearly every producer expressed strong concern over the price of labor. Most reported that in 1967/68 they were paying at least \$1.15 an hour for hand operations and \$1.25 an hour for machine operations. They expressed concern for next year when the minimum agriculture wage rate would be \$1.30 per hour.

Statewide, the Florida cash farm wage rate during winter and spring months rose about 2 percent a year during the 1960-64 period, but from 1964 to 1968, the increase averaged about 10 percent a year (app. fig. 15).

By 1968, prospects were still distant for mechanizing the labor intensive operations required by a number of commodities. Mechanization would be required, however, to make production from Florida more competitive with that from foreign areas which have lower wage rates. The survey team found that machine methods available to Florida producers are available and quite widely used by producers in other areas, including Mexico (app. table 22). Thus, new technology adopted in Florida would soon be adopted in Mexico and in other areas where economically

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<sup>8/</sup> Public Law 89-601, 89th Congress, H.R. 13712, Sept. 23, 1966.

feasible. However, technology which substantially reduced labor requirements would tend to reduce the advantage which Mexico has because of differences in lower wage rates, and to accentuate Mexico's disadvantage in higher machinery costs.

The Texas lower Rio Grande Valley also had an advantage for producing winter vegetables at one time in the form of a ready supply of farm labor at a low wage rate. The effective supply of labor in this area has been decreasing steadily as a result of the attraction of nonfarm employment opportunities, and more restrictive border crossing policies. Because of this, and also because of minimum wage legislation, adverse-effect regulations, and union activities, most Texas operators were paying about the same price for labor in 1967/68 as were Florida producers. Growers feel that many of the domestic workers remaining in the area are not worth this wage. Growers cited the fact that southern Texas is the winter home of many migrants who travel in the midwest migratory stream following sugar beet production. The family travels in a group, with teenagers and young adults departing from Texas to work in northern sugar beet production just when Texas winter produce would be ready for harvest. As a result, many older people and children are left in the area. These comprise an extremely high proportion of the domestic labor force, and the southern Texas producers feel that they are not capable of earning the minimum wage. However, inquiries as to actual labor shortages turned up only one instance where a crop was lost because workers were not available. This was in Atascosa County, about 30 miles south of San Antonio. In this strawberry producing area, heavy rains and a few hot days compressed the strawberry harvest season. Not enough workers could be recruited to pick between showers all the crop that was available. This is not an unusual situation. Yet farmers cannot expect to have large surpluses of labor waiting just in case weather conditions are poor and then furnish workers employment for only a day or two.

Farm wage rates in California are among the highest in the nation and are seven to eight times higher than those in Mexico. California winter vegetable producers, as indicated by county farm advisors, have shifted from winter vegetable crops to more labor extensive crops.

From a vegetable producer's standpoint, Mexico is blessed with a large work force relative to the demand for labor (app. tables 23, 24). Considerable unemployment occurs throughout Mexico, but workers living near the vegetable production areas tend to be more fully employed than those in other areas. As a result, in the Culiacan area particularly, and to a lesser extent in the other production areas, vegetable growers must provide transportation for workers each season between their rural mountain homes and the production areas.

The movement of people from small mountain villages to the production areas like Culiacan is one that the Mexican Government supervises rather carefully. The Government is quite interested in the workers' welfare. Government officials try to limit the number of workers brought into an area to that which will actually be used over a 5- to 7-month period. They do not want large numbers of unemployed workers living away from their homes. Thus, they insist upon the producers providing continuity of employment for the migrant workers.

Most of the workers are recruited as family units. The men and boys work in the fields hoeing, weeding, staking, tying, and picking. The women work in the packing sheds at such tasks as grading, sorting, and packing. Children as young as 12 are allowed to work in the packing sheds.

Workers' housing of varying quality is provided by the grower. It generally consists of communal houses with one room per family. Houses range in construction from good concrete block or adobe construction to crude thatch and mud shacks. Most have dirt floors.

Producers, in addition to providing housing, must provide schooling for the youngsters that come with the workers. They must provide a school building, and playground, and hire a teacher. This is part of the requirements which must be met before seasonal workers can be employed. Mexico is trying to give every individual the opportunity to learn to read and write and is seeking to provide training universally through the first six grades of school. At present, the vegetable production areas offer better schooling than is available in most rural villages.

When the vegetable season ends and growers are finished with field and plant workers, they must transport them and their belongings back to their permanent homes. This is all part of the labor contract. The added cost to growers who comply fully with the requirements of providing schooling, contributions to the Mexican social security system, and transportation of the workers amounts to about 10 percent of the cash wage. The estimates of labor costs in production and harvesting, presented below, include a 10 percent allowance for these indirect labor expenses.

The minimum cash wage per day is 26.25 pesos or \$2.10. Usually, both the husband and wife work and they are able to accumulate a substantial amount of income during the 6- or 7-month season. During the rest of the year, they operate their small farms in the mountains. Producers estimate that workers would probably only earn 3 to 5 pesos a day back home in the mountains. Thus, workers welcome the opportunity to come to the vegetable production areas. Most of them are unskilled field hands. Some are capable of working with mules. Most are not able to handle complex machinery. The machine operators are largely former "braceros" (temporary contract agricultural workers) who received some training in California, Arizona, and New Mexico while working under provisions of Public Law 78. Most are not as well trained as machine operators in the United States. This is one of the reasons why the cost of operation and repair of machines in Mexico is somewhat higher than for similar machines in the United States.

Mexican labor costs, like those in the United States, are also rising. In Culiacan, the minimum cash rate per hour in 1956 was \$0.08; in 1966, \$0.215; and in 1968 it was \$0.289. The minimum wage rate increased from 1966 to 1968 at a compound annual rate of 16 percent, but in cents per hour the gain averaged only 3.7 cents a year. For the country as a whole, minimum rates rose from \$0.31 per day in 1950 to \$1.26 in 1966. Generally, the minimum wage rate is changed every 2 years.

## Production Management Units

In determining the scope and importance of an industry, the number of participants and size distribution of acreage controlled are frequently used as measures. Unfortunately, statistics on the number of winter vegetable producers and the acreage each controls are not complete.

The number of "producers" of winter vegetables in South Florida varies from year to year. Because of financial backing and ties, it is difficult to ascertain the number of separate management units. In South Florida, for 1967/68, there were an estimated 230 tomato growers. Of these, 75 were located in Dade County, 55 in the Pompano Strip area, and 100 in the Immokalee area. Green pepper growers probably number fewer than 100 in South Florida. Numbers of cucumber, eggplant, and strawberry growers are estimated at 100, 25, and 75, respectively, in South Florida, with an additional 50 strawberry growers in the Plant City area. In total, because some growers produce several crops, there are probably about 400 winter vegetable producers growing these crops in South Florida.

In Sinaloa, Mexico, a list of "producers" who were authorized to plant acreage of vegetables for export in 1967-68 totaled 165 persons. However, many of these were a part of larger firms. Of about 150 who were authorized to grow staked tomatoes, there were probably fewer than 50 separate management units. In estimating the number of firms growing produce, including staked tomatoes, the survey team relied rather heavily upon lists prepared by the local associations. Of the nearly 50 firms producing tomatoes, about 30 also grew bell peppers, 30 grew cucumbers, and fewer than 10 grew eggplant. Also, fewer than 10 grew cantaloups.

The number of cantaloup producers in the Apatzingan area was not known by the survey team. The local association represented many small ejido farmers and the number of management units was not estimated. All cantaloups, however, were packed through six sheds.

The number of strawberry growers in the Zamora-Irapuato area was not known by the survey team. Fewer than 30 large producers were evident, but there were many ejido farmers growing berries for export.

The size distribution of acres handled by individual management units is difficult to estimate. In Florida, sketchy data indicate that most tomato growers raised from 100 to 500 acres of tomatoes, but a few firms had more than 1,000 acres each. Few had less than 50 acres. The size of pepper plantings was appreciably smaller, with most holdings averaging less than 100 acres. A substantial number of producers grew less than 50 acres of bell peppers. Cucumber producers had acreage ranging from 20 to 400 acres with the most common holdings averaging 150 acres. The few cantaloup growers in South Florida generally had less than 50 acres each. Eggplant holdings were remarkably uniform in size with most averaging 40 acres. Strawberry acreage in South Florida ranged from 1 to 100 acres per producer with 15 to 30 acres being more common. In the Plant City area, individual acreages were smaller, with 10 acres the more common size.

Acreage distribution data in Mexico are scanty but several management units reported control of from 750 to 1,000 acres of winter vegetables for export. Tomato holdings ranged up to 1,000 acres. Green pepper acreages were smaller with the larger units averaging 500 acres. Eggplant production firms grew from 10 to 150 acres. Cucumber management units generally had fewer than 200 acres each. Cantaloup growers in Sinaloa had large holdings ranging from 500 to 1,500 acres. In Apatzingan they were appreciably smaller. Strawberry firms had acreages ranging from small ejido plots to holdings of 6,000 acres or more. Most of the firms producing fresh winter produce had sufficient acreage to support large inventories of equipment and to maintain large modern packing sheds. These firms generally had acreage holdings as large as their Florida counterparts.

### Shifts Within Production Areas

In addition to the shifting of production from the United States to Mexico, there have been substantial shifts within both Florida and Mexican production areas.

In Florida, there has been a substantial shift in acreage of vine-ripe tomatoes from the lower east coast to the southwestern area. In 1966/67 about half the acreage was located in the southwestern area.<sup>9/</sup> A major reason for the shift is the desire to obtain "new" land that is free of weeds and tomato diseases. Land rent is also cheaper, but land preparation expenses, including irrigation and drainage ditching, are higher than on the lower east coast. Per acre yields in 1966/67 did not reflect the expected increased productivity of "new" land, since lower east coast yields were higher than those in the southwestern region.

Cucumber production also has shifted westward in Florida. Yield per acre in 1966/67 in southwestern Florida averaged 205 bushels as compared with 175 bushels in southeastern Florida, a 17-percent differential in favor of the southwest.

Cantaloup production in Florida is declining, and most of the acreage decrease has occurred in southeastern Florida.

Green pepper production has been increasing, mostly in the southwest. Southeastern Florida remains the principal center of eggplant production.

Strawberry production has fallen off drastically since 1964/65. Acreage in southeastern Florida declined more than one-half in that period. Acreage remained largely unchanged in the Plant City area (Hillsborough County).

In Mexico, industry representatives informed the survey team that winter tomato production had shifted from areas in the south near Mazatlan and north near Guaymas in Sonora to the Culiacan and Los Mochis areas of Sinaloa. While frosts were not a problem, cold winds may have affected yields and production and influenced the shift in production area. No data on acreages by locality are available to indicate the magnitude of these shifts.

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<sup>9/</sup> Florida Agricultural Statistics, Vegetable Summary, 1967. Florida Crop and Livestock Reporting Service and Division of Marketing, Florida Department of Agriculture.

## Production and Marketing Interdependencies

Before Mexican production of winter produce began to expand in the mid-1950's, domestic areas already had numerous firms which had extended growing operations to include packing and shipping. In some instances, shipping firms and other buyers were financing growers, contracting for supplies, and so on. Similar interrelationships between U.S. firms and Mexican growers played an important role in the development of Mexican supply areas.

The hub of activity for most of the Mexican winter produce trade is in Nogales, Arizona. This is the best located point of access from northwestern Mexico to the U.S. market and has attracted U.S. firms to furnish money and technical information for growing operations. Brokers, chain store buyers, and other buyers commonly active in important vegetable markets of the United States are also present in Nogales.

The influence of these firms is waning but some still exercise considerable control. Some have entered into partnership with Mexican firms. In such arrangements, U.S. firms are reported to have interest in and control over production operations. If larger supplies are needed than can be furnished by the firm's own production facilities, the production base is extended through financial and supervisory agreement with other growers.

Some shipper-distributors handling significant volumes of produce apparently have no direct proprietary interests in Mexican producing areas. These contract orally or in writing with growers for supplies. To protect their substantial financial advances, they typically keep in supervisory touch with production and packing operations and take control of marketing activities from the time shipments leave the packinghouse, or upon arrival of the produce in Nogales. This puts the shipper in a commanding position when it comes to settling accounts. Some grower-shipper relationships have lasted for years.

Large sums of money are involved in grower-shipper agreements. For the more important shippers, the total annual outlay can amount to a half million dollars. Depending upon the size of the operation, advances required for separate agreements can range from a few thousand dollars to \$50,000 or \$60,000 or more.

Not all grower-shipper arrangements bind the shipper to financial commitments. Some shippers use several types of agreements ranging from those that allow tight supervisory control, with financing provided by the shipper, all the way to a simple commission agent-client relationship. Certain shippers profess not to furnish any production capital but do claim to fund harvesting and packing activities. Brokers have the least influence over supplies; they usually work on a fee or commission basis and may occasionally buy for their own account. Here, initiative lies with independent growers who may or may not already have their own marketing establishments in Nogales. These independent and semi-independent producers have been the most active in shifting operations to Culiacan.

Laredo, Texas, is to the strawberry and cantaloup industries in southwestern Mexico what Nogales, Arizona, is to the produce industry in the Northwest. The scope of activities, however, is much smaller. Representatives of U.S. firms having a direct hand in industry affairs and brokers who do business on a profit-sharing or commission basis are stationed in Laredo to receive and service shipments. Although there is less tangible evidence of the nature of activities in southwestern Mexico, U.S. capital seems to play an even larger part in these industries in southwest Mexico than in the Culiacan area. There is a pervading impression that most members of the industry follow the lead of a few U.S. firms in maintaining strong marketing positions.

### Relative Production Costs

The cost estimates which follow are those experienced under production practices followed by growers rated as "better than average." They contain data pertinent for decision making by growers. Allowances for managerial fees or normal profits are not included. Material inputs were listed at 1967/68 prices; land was entered on a cash-rent basis; interest charges on growing costs were assessed for the production period; other overhead items (telephone, insurance, licenses, etc.) were entered at 5 percent of total growing costs. An equipment inventory was developed and the average value calculated. Depreciation was on a straight-line basis and most items were fully depreciated in 10 years.

In most areas and for most crops, the survey yields were higher than the averages reported by the Crop Reporting Board of the Statistical Reporting Service. Mexican yields were also higher than the average for all producers. This reflects the managerial ability of the "above average" producers studied.

### Tomatoes

Two types of tomatoes are grown--vine-ripened and mature-green. Plants for tomatoes which are to be allowed to ripen on the vine are tied to stakes, hence, vine-ripened tomatoes are also called staked tomatoes. Plants for tomatoes which are to be harvested at the mature-green stage may be left to spread out on the ground--such tomatoes are also called ground tomatoes.

The market for mature-green (ground) tomatoes is different from that for vine-ripened (staked) tomatoes. Mature-green tomatoes can be produced at lower cost and generally bring a lower price at the shipping point than do vine-ripes. Mature-green tomatoes are harvested before ripening and sent north to ripening rooms near the market. Obviously, the ripening operation involves marketing costs which vine-ripening avoids. These costs were not included in this study, a fact which must be remembered in comparing the costs of mature-green with those of vine-ripe tomatoes which will be presented later. Mature-green tomatoes, after ripening, are graded, sized, and packed in cellophane tubes. Consequently, when these tomatoes reach an acceptable size, most of them are harvested with little concern for maturity. The differences between production and harvesting practices for the two types of tomatoes have important cost implications.

In Florida, the cost of producing (not including harvesting) mature-green tomatoes in 1967/68 averaged about 63 cents per 20 pounds (app. table 36). (Forty-pound lugs are standard for mature-green tomatoes in Florida, but costs are stated in this report on a 20-pound basis to facilitate comparison with the standard package of vine-ripe tomatoes.)

Preharvest cost for Florida mature-green tomatoes of 63 cents per 20-pound box equivalent was the lowest cost for winter tomatoes produced in the United States (app. tables 36-39). However, Texas fall and spring mature-green tomatoes were produced at lower cost.

During the winter months, December through April, Florida is the principal producer of vine-ripe tomatoes in the United States, although northern green-house production is significant. The 1967/68 Florida crop cost about 84 cents per 20-pound lug to produce.

Yields of vine-ripe tomatoes are higher than yields of mature-green tomatoes because staking the plants off the ground permits them to be kept in production longer; also, the varieties having indeterminate growth habits which may be used for vine-ripe tomatoes are inherently higher-yielding. The yield advantage tends to be offset by expenditures for additional labor and for staking materials.

Texas mature-green tomatoes are usually not available from mid-December until early May. Yields are only about one-half those obtained in Florida. Frost generally destroys crops planted early enough to come into bearing after December 15. Heat and untimely rains usually force termination of production in mid-June. Yet, in spite of greatly reduced yields, preharvest production costs averaged only \$0.42 per 20-pound lug.

Mexican tomato yields per acre are about the same as reported by Florida vine-ripe tomato growers--1,800 boxes. However, only about 60 percent of the yield is exported; the rest is kept for domestic use. The cost of producing a 20-pound crate of U.S. No. 1 vine-ripe tomatoes in Mexico averaged 31 cents in 1967/68 (app. table 40).

Some vegetable producers in Mexico continue to use relatively primitive equipment such as mule cultivators and hand dusters because such equipment is effective and relatively inexpensive to operate, given the low wage rates. However, in spite of low wage rates, most Mexican producers use the most modern labor-replacing machinery. Modern crawler-type machinery, some of narrow gauge for between-row work, is found on nearly every farm in the Culiacan area. Wheel tractors of latest design are also widely used.

Fertilizer is produced in government-owned facilities in Mexico, and the prices charged to producers are comparable with those paid for similar materials by growers in the United States. Pesticides are needed and are becoming widely used. In the absence of an extension service, Mexican producers individually contract with specialists for soil testing, fertilizer recommendations, and pest control information. This information is furnished to the individual grower on a crop-year basis at a fixed charge per hectare.

All-weather roads connect each farm with the main shipping points, thus facilitating movement of the produce in modern conveyances at low cost. Equipment and handling facilities are as modern as those found in any U.S. production area. Mexican growers have readily adopted such advanced technology as aerial spraying and dusting. In the strawberry areas, Mexican facilities may be more complete than similar U.S. handling facilities.

Mexican producers have developed considerable expertise in various phases of production. This expertise, coupled with the supervision and substantial capital provided by American firms in the area, enables producers to handle most production problems. For example, untimely rains and high humidity in the spring of 1968 brought on the most severe outbreak of late blight the area had ever experienced. Initially, it looked as if the tomato crop would be destroyed. However, Mexican producers, with the assistance of American backers, hurriedly rushed in sufficient fungicides and application equipment to treat this disease. As a result, the blight was retarded and production continued on new growth at the top of the diseased plants.

### Peppers

Growers in Florida reported that in 1967/68 the cost per bushel of bell peppers averaged \$0.95 when an average yield of 645 crates per acre was obtained (app. table 41). Labor charges amounted to 29 percent of the total preharvest production cost.

Production of bell peppers in South Texas is restricted to fall and spring crops. With a yield of 500 bushels per acre, preharvest cost averaged \$0.70 per bushel (app. table 42). Labor used on this crop in Texas cost almost \$100 less per acre than in Florida and \$40 less than in Mexico, due largely to reduced thinning and weeding.

The cost of producing bell peppers in Mexico averaged \$1.30 per bushel based on 360 bushels exported per acre (app. table 43). This high cost per crate is largely the result of low marketable yield, only about 55 percent of the total yield, which was about the same as in Florida. Only about one-half of the 1967/68 crop was of the quality specified by U.S. produce buyers. Much of the remainder would have been salable, but had no demand in Mexico and thus was dumped. The Mexican demand for bell peppers is insignificant, as consumers there prefer the hot chili-type pepper.

In contrast with Florida production, which is direct seeded, Mexican producers use transplants. Another difference is that Mexican producers stake their green peppers. Short stakes are used and the plants are tied three times. In contrast, Florida producers do not stake. Even with this high labor usage for transplanting, hoeing, and staking in Mexico, labor costs in 1967/68 amounted to only 26 percent of preharvest costs.

Mexican production generally is ready for harvest starting in November and terminating in May. No imports are received from Mexico after the middle of May. From the standpoint of preharvest cost of production alone, Mexico does not appear to have an advantage over Florida or Texas at the current level of marketable yield.

## Cucumbers

There are two principal winter cucumber production areas in Florida, the lower east coast area (Dade County) and the lower west coast area (centered around Immokalee). Because of differences in soil and resulting differences in land preparation, production practices differ considerably between the two areas. With yields of 330 bushels an acre in 1967/68, growers in Dade County spent \$1.16 per bushel for preharvest work. Labor charges amounted to about 14 percent. Because Immokalee had lower costs and higher yields--391 bushels per acre--the preharvest cost per bushel amounted to only 82 cents (app. tables 44, 45). This was the lowest production cost for cucumbers reported in any area being studied.

In Texas, the fall and spring cucumber yields were only about 175 bushels per acre, and preharvest costs averaged \$1.32 per bushel in 1967/68 (app. table 46). One reason for the low yield in Texas is that farmers use little fertilizer, spending less than \$25 per acre, compared with \$100 or more in Florida.

Winter production of cucumbers in California is quite uncertain because of cold weather and frequent frosts. However, some winter cucumbers are grown in San Diego County and in the desert areas. Data used in the study were based on a crop budget for Tulare County. While this is a rather high cost area, it exemplifies the expenditures that must be incurred to produce cucumbers in Southern California during winter. In this area, although yields reached 350 bushels an acre, preharvest costs averaged \$2.69 per bushel in 1967/68 (app. table 47).

The extremely high cost of production stems in large part from the need to protect plants from the unfavorable winter climate. To counter threat of frosts, growers purchase growing plants in containers and set them out under protective hot caps. Costs incurred here (which are not borne by Florida and Texas growers) amount to about \$265 per acre. This is more than the entire cost per acre of producing cucumbers in Texas. In addition, nearly \$90 per acre was spent in setting up and operating heaters and wind machines to prevent frost damage to the crop. Under these conditions, it is difficult for California winter cucumbers to compete with those of Florida or Mexico.

The cost of producing cucumbers for export to the United States from the Sinaloa area of Mexico in 1967/68 was \$1.06 per crate (app. table 48). An average of 235 export crates per acre were marketed.

Mexican growers report that the Sinaloa area is not as well adapted to cucumber growing as some other areas of the Western Hemisphere. They find competition from the Bahamas and other Caribbean areas quite rigorous. There is a continuing search for new varieties which will yield more export quality cucumbers. U.S. produce buyers order primarily the top grades: U.S. super select and U.S. select. As a result, only about 60 percent of the 1967/68 production was exported. The remainder, which would be classified as U.S. standard and lower grades, went to the domestic market at greatly reduced prices.

Some cucumbers have been produced south of the Merida area on the Yucatan peninsula. Currently, this area is not an important cucumber production center. Yet, with improved sea transportation and more production capital available, acreage can be readily expanded. No cost data were obtained for this area.

### Eggplant

In the past few years, Mexican production of eggplant has been increasing rapidly. At the same time, Florida acreage has been declining slightly; it declined from about 2,700 acres harvested in 1960/61 to about 2,200 acres in 1966/67. No other commercial production is available during the winter months than that produced in Florida or imported from Mexico. In Florida, average yield per acre in 1967/68 was 845 bushels, and preharvest costs totaled \$0.77 per bushel (app. table 49). Of this total, labor charges amounted to about 19 percent.

Production of eggplant in Mexico is largely restricted to the Sinaloa area around Culiacan. Small quantities are also produced in the Yucatan, but cost data for this analysis were obtained only from Culiacan producers. The cost of producing a crate of eggplant in Sinaloa was \$0.31 for a yield of 1,200 export bushel crates per acre (app. table 50). This is about 60 percent less than the cost of growing a similar product in Florida. Thus, from the standpoint of production costs only, Mexican producers offer serious competition to eggplant producers in Florida.

### Cantaloups

There is virtually no domestic winter production of cantaloups in the United States. The small production available from Florida is largely a spring crop that does not reach significant proportions until May. In 1966, Florida produced an estimated 1,200 acres of spring cantaloups. Insufficient data were obtained on the Florida winter cantaloup crop to make cost analyses.

In Texas, cantaloups are produced as both a spring and a summer crop. The spring crop does not usually come into volume before the first of May and peaks in June. Later-planted cantaloups are harvested in July and August, with volume declining in September. Yields of 150 crates per acre were obtained on the 1968 spring crop, giving a preharvest cost per crate of \$1.41 (app. table 51).

There is almost no California production of cantaloups in the winter. Both a spring and a fall crop are grown in the desert areas in the Imperial Valley of California; and in the irrigated areas of Arizona.

In the Imperial Valley, costs are based on an early spring crop, which is not harvested before the first of May. Volume production starts about June 1 and ends by August 1. In 1968, California growers harvested 160 crates of cantaloups per acre, at costs (up to harvest time) of \$1.99 per crate (app. table 52).

Producers in the California desert have, over the years, greatly decreased their cantaloup acreage as a result of older varieties becoming diseased and yielding less. With the new variety--Perlita--a yield of 160 crates or more per acre can be expected. It is quite resistant to most of the ailments of the

old varieties. Thus, Imperial Valley and Yuma producers are expecting to substantially increase their production in the future.

Of the two principal areas of cantaloup production in Mexico, only one is truly a winter area. This is the Apatzingan area in the State of Michoacan. The other area, which harvests in early spring, is located around Bamoa, in the State of Sinaloa.

Harvesting in the Apatzingan area begins about the first week of February; production peaks in March and April and ends by mid-May. Production from Bamoa starts about the first of March and supplements the early crop. Bamoa production expands in April and peaks in May, with final exports ending in June when U.S. domestic production becomes available.

The cost of producing a crate of cantaloups in the winter of 1967/68 averaged \$2.54 in Apatzingan, Mexico, with marketable yields of 125 crates per acre. Labor amounted to \$61, or 19 percent (app. table 53). The Apatzingan area has a lower minimum wage rate for its workers than does Sinaloa. Apatzingan field hands receive the minimum wage of \$0.18 per hour, while machine operators receive \$0.30. As a result a very large amount of labor is used per acre.

The 1967/68 preharvest cost of producing a crate of cantaloups in Sinaloa, Mexico, with a marketed yield of 110 crates per acre, was \$3.11 (app. table 54). This was 57 cents more than was required to produce a crate in Apatzingan. Cantaloups in Sinaloa were not placed on rocks to prevent scarring, as they usually are in Apatzingan. However, at the early runner stage, vines were tipped to prevent excess vine growth. This reduction of vine growth results in fewer but larger melons.

Wages paid to field hands in the Sinaloa area were 44 percent higher than those paid in Apatzingan. And, importation of Perlita variety seed from the United States also increased cost of production per crate because yield was not significantly increased over that grown from domestic seed.

Producers throughout Mexico indicated that they could not continue to ship cantaloups into the States after our production started in California, Arizona, and Texas. Mexico is a high cost cantaloup production area and grows strictly for the winter market.

### Strawberries

Domestic production of winter strawberries is centered primarily in Florida. Southern California has some late winter and early spring production beginning in February, as does Texas.

The analysis of strawberry production costs is more difficult than that for other crops. In the domestic areas, nearly all the winter strawberry crop is sold as a fresh market product or discarded as culls. In contrast, the best of the Mexican product is sold in the fresh market and the small, misshapen, and imperfect berries are sold to processors. In total, about 60 percent of the Mexican crop is processed. All of the second year's production is processed. Because of this multiuse, 60 percent of the production costs in the study were

distributed to processing and 40 percent to fresh market. Only the portion of costs prorated to the fresh market are considered in this report. In the United States, only a small portion of the fresh winter crop is sold to processors. No Florida producers reported sales to processors. The crop is grown as an annual.

Winter strawberries are grown in two areas in Florida, around Miami in Dade County, and in the Plant City area of west central Florida. Production in Dade County is slightly earlier than that at Plant City. Costs and practices differ somewhat in the two areas, and are analyzed separately.

In 1967/68, the cost of producing a 12-pint flat of winter strawberries in Dade County was \$0.83 with a yield of 1,510 flats per acre (app. table 55). A substantial cost is accrued for plants and plastic ground cover. The majority of producers, after an initial establishment period, lay plastic over the plants, cut holes in the plastic, and pull the plants through. This is a rather expensive operation. Plastic, in spite of the costs associated with it, is an essential part of the production scheme for fresh market berries. It controls weeds effectively, provides a clean surface for the berries to rest upon, prevents them from being infected by rots as a result of contact with the ground.

The cost of producing a flat of winter strawberries in the Plant City area in 1967/68 averaged \$0.93 (app. table 56). Producers in the Plant City area all fumigated their land to combat nematodes, various root rot diseases, and weeds. As a result, their labor bill for weeding was only a third that reported by Dade County growers.

Acreages in the Plant City area were somewhat smaller than those near Miami; respective plantings averaged 16 and 22 acres per farm. Smaller producers at Plant City felt particularly disadvantaged by competition from larger Dade County producers and Mexican producers.

The principal strawberry producing area in Texas is the Poteet area of Atascosa County, south of San Antonio. Acreage there declined from about 900 acres in 1960 to an estimated 300 acres in 1968.

Climatic conditions are not favorable to strawberry production in Texas. Frequency of untimely rain, hail, and freezes appear to be increasing. These factors generally restrict yields to a range of from 350 to 450 12-pint flats per acre. The 1967/68 preharvest cost of \$2.09 per flat points up the extremely high cost of production in the area (app. table 57). Strawberry production in Texas, other than for local markets, has essentially terminated.

Since 1966, California fresh-market strawberry producers have been shifting their production to summer planting. Using new varieties developed by the University of California and planting strawberries in the middle of August, growers develop a mature plant by spring which will yield larger and better berries for fresh market than older varieties planted in spring and grown for a year. It is cheaper to produce berries this way, because growers do not have the added cost of weeding and irrigating through spring and early summer. With this new development, Orange and San Diego Counties have been able to increase acreage for late winter or early spring fresh market production and have effectively reduced costs. Preharvest cost per flat averaged \$0.59 with yields of

3,500 12-pint trays per acre (app. table 58). This is more than one-fourth below the lowest cost in Florida, and supports the belief of Florida growers that California producers offer strong competition.

Labor costs per acre in Southern California in 1968 amounted to about one-fourth of the entire preharvest cost. Fumigation contributes to high costs in this area. Fumigants are injected into the soil and covered with a polyethylene film sheet for at least 24 hours. Fumigation costs \$220 per acre compared with the \$7 per acre spent by Plant City, Florida, producers. The ability of higher priced varieties to produce a yield two to three times as large as that produced by the standard variety used in Florida makes this added investment worthwhile. From a production standpoint, California early, fresh-market strawberries have no serious domestic competition.

Because the soil's high saline content reduces yield in Irapuato, Mexico, there has been a shift in acreage in the last several years to the Zamora area. This study was more heavily weighted to reflect production conditions from Zamora. In 1967/68, the prorated cost of producing a flat of strawberries in Mexico for fresh market was \$0.37, with an average yield of 610 export flats per acre (app. table 59). Minimum wages ranged from \$0.18 an hour, for field hands to \$0.35 an hour for machine operators. The more progressive producers, those who tried to produce for the fresh market, reported purchasing plants from the United States. The cost of plants was the largest single cost item for Mexican producers.

In the Zamora area, strawberries are grown by essentially the same methods as they are in the United States, with two rows per raised bed. They are not, however, grown on plastic.

Producers reported that plastic was scarce in Mexico and that weeds could be controlled at lower cost with hand labor. All strawberry fields observed by the survey team were remarkably free of weeds.

All fresh-market strawberries destined for export are dipped in a disinfectant to control molds. This action also rinses soil from the fruit. No U.S. producers reported dipping fruit.

#### Development and Potential Production in Each Area

The commercial vegetable producers in Florida are, in general, shifting to specialized production of a single winter vegetable. A number of the tomato growers that were interviewed said that they grow no crops other than tomatoes. The reason given was the technology and management skills required to produce a high quality product were so specific that they did not lend themselves to the production of other crops. Also, the timing of required practices created conflicting needs for equipment and workers when more than one crop was produced. However, growers were aware that specializing to such an extent increased risks.

Some crops do tend to complement one another from a production standpoint and are grown by the same producer. For example, ground tomatoes and green peppers are somewhat similar in production technology, yet do not seriously conflict with timing of operations. A few growers reported having this

combination. Others reported growing both eggplant and peppers. Some cucumber growers reported that they also grew squash.

There is also a tendency toward area specialization. For instance, mature-green tomatoes are grown in Dade County, vine-ripe tomatoes in the Pompano and Immokalee areas, and eggplants in the Pompano area. Intense area production specialization permits certain economies with specialized marketing.

Most Florida producers interviewed did not own the land that they were farming. Some owned a portion, but most rented land from large land holding corporations. Since he does not own land and much of his equipment is of the regular row-crop type, the vegetable producer can shift out of the vegetable business rather quickly. Much of his equipment inventory can be used in other types of farming. However, where farmers also own packing sheds and equipment, the fixed investment has a tendency to deter shifting to other enterprises.

Producers in South Florida have few alternative crops to winter vegetables. Acreage restrictions on such possible crops as sugarcane and rice preclude production of these commodities. Thus, land retired from production of winter vegetables tends to be left idle. Much of the area involved has potential value for future urban development.

The lower Rio Grande Valley of Texas offers no great advantage to the production of most vegetables except for spring cantaloups. With the new Perlita variety of cantaloup, yields are higher and cost per crate is reduced; thus, Texas producers will probably increase acreage. However, for most other vegetables, acreage is expected to decline.

In Texas, however, producers are not so highly specialized as in Florida. They generally grow vegetables in combination with cotton, grain sorghums, and other field crops. Producers have been expanding acreage of citrus and milo in the lower Rio Grande Valley. Vegetable growers interviewed in the study indicated that they would try to increase cotton and milo acreage, and try to find other more labor-extensive crops rather than continuing to produce vegetables. The only exception to this analysis is the cantaloup industry. Texas cantaloup growers feel that they can compete with Mexico easier than with California and Arizona. The principal effect of Mexican production, they feel, is that it satisfies the early premium price market to such an extent that it decreases the average price Texas producers receive for cantaloups.

Production of winter vegetables in southern California in competition with Mexico has been virtually terminated. The desert and lower coastal areas of California have not been important producers of winter tomatoes for several years. Southern California growers recognized that their adverse winter weather prohibited competition with Mexico's more favorable climatic conditions. In addition, Mexico has available a very large work force at low wage rates. The one crop that offers an exception to this pessimistic outlook is spring cantaloup. With new, improved varieties, that will return a better yield, growers in the desert area of California expect to increase cantaloup production from its present 8,000 to 20,000 acres or more. Cantaloup yields decreased from 115 hundredweight per acre in 1961/62 to only 45 hundredweight per acre in 1966. Yield predictions for the Perlita variety are in excess of 150 hundredweight per acre, or more than three times the 1966 yield.

The Culiacan area of Sinaloa has the production potential, at the costs found in the study, to supply the whole U.S. market with its winter vegetable requirements. The importance of its competition with U.S. producing areas, however, would depend upon the marketing and transportation costs involved in expanding the market area. The alternatives for the Mexican producers are such crops as cotton, safflower, rice, and sugarcane. These commodities and winter vegetables produced for the domestic market in Mexico are less profitable than winter vegetables exported to the United States and Canada. Mexican vegetable demand is less than that of the United States, and the capacity of the domestic market is strained by supplies (generally of lower quality) diverted from the export market to prevent "spoiling" the latter.

### Production Summary

Vegetable growers have been facing mounting costs of production inputs. Rising labor costs have become important to domestic growers who cite spiraling wage rates, lower quality help, growing unavailability of workers, and more numerous and more stringent government regulations concerning the hiring, transportation, and housing of workers as prime factors in the labor cost rise. Their concern is understandable as labor accounts for one- to two-fifths of all production costs for most of the crops studied (app. table 60).

Mexican producers generally had lower labor costs, both absolutely and relatively. For the large volume export crops of staked tomatoes and strawberries, Mexican producers reported that labor costs as a proportion of total production costs were only about half those incurred by U.S. growers. However, for the other commodities studied, labor costs, surprisingly, were about the same proportion of total costs in Mexico as in the United States. For example, in 1967/68 cost of the labor input for bell peppers in Florida was 29 percent and in Mexico 27 percent of total production cost; for eggplants, 19 percent in Florida and 21 percent in Mexico. With both crops in Mexico, the extra labor for staking and tying caused the heavier relative labor input. Thus, while labor costs per hour in Mexico were from one-fourth to one-eighth those in the United States, Mexican producers used labor so freely that for most crops there was little difference in the proportion of total input costs accounted for by labor.

Costs of operating and repairing equipment in Mexico is about double that for domestic producers as a proportion of all inputs. Mexican growers import much equipment from the United States and the import duty on spare parts is reportedly high. Distance from manufacturer and time required to import or make repair parts is so long that growers must maintain a much heavier inventory of repair parts than domestic growers. Also, cost of fuel and lubricants in Mexico is appreciably higher than in the United States.

Depreciation and interest on equipment as a percentage of total costs was higher for domestic growers than for their Mexican counterparts for all crops except staked tomatoes. Domestic growers were generally more heavily mechanized. Equipment on Mexican farms was used over larger acreages than in the United States. Thus, the depreciation and interest charge per acre in Mexico was low, despite higher initial cost and an interest rate 50 percent higher than in the United States.

Fertilizer inputs were a much higher part of total cost for the domestic grower than for the Mexican grower. Domestic growers used much more fertilizer per acre. Florida producers have to use a high level of fertilizer due to heavy leaching of the predominately sandy soil by frequent heavy rains. The clay loam soil of Sinaloa, Mexico, is more retentive of nutrients and also is higher in native fertility. Mexican producers also use fertilizer at a low level, except for tomatoes. Fertilizer experiments in Sinaloa indicate that tomato growers are overfertilizing.

Pesticides, as a proportion of total inputs, were more costly to Mexican producers than to domestic growers, except for eggplants and strawberries. The high pesticide cost to grow U.S. eggplants stems from rather continuous use of the same ground for eggplants. Thus, weeds and disease are more prevalent than with a longer rotation. With strawberries grown in the United States, plastic and straw were used to control weeds and keep down disease. Mexican growers used neither plastic nor straw, but relied on hand labor to control weeds. Additionally, pesticides cost appreciably more per pound in Mexico than in the United States and the choice of preparations offered to growers was much smaller.

Land rent generally represented a very small part of production cost for most vegetable crops. Of crops under study, land rent usually ranged from 3 to 10 percent. However, Texas producers were paying a much higher land rent in the lower Rio Grande Valley--13 to 14 percent of production costs went to the landlord. Mexican growers reported land charges at 5 to 10 percent of total expenses.

Water costs were generally less than 1 percent of production input costs on all crops in both Florida and Mexico, but were from 2 to 5 percent in Texas and California.

Total preharvest costs indicate why Mexican winter vegetable production, particularly of vine-ripe tomatoes, offers such strong competition to U.S. producers (tables 4, 8). Production cost per export crate from Mexico was less than two-fifths the cost of producing vine-ripe, staked tomatoes in Florida. There is, of course, more to competition than just cost of producing the product. The additional costs--harvesting, marketing, transportation, border duties, and other charges--will be examined next.

Table 4.--Winter produce: Estimated preharvest cost per container, selected crops, by areas, 1967/68

Crop	Container	Preharvest cost per container produced in:						
		Florida		Texas	California	Mexico <sup>1/</sup>		
		South	Other			Sinaloa	Other	
		<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Vine-ripe tomatoes.....	20-lb. lug	.84	---	---	0.72	0.31	---	
Mature-green tomatoes.....	40-lb. lug	1.25	---	0.83	---	---	---	
Bell peppers.....	Bushel	.95	---	.70	---	1.30	---	
Cucumbers.....	Bushel	1.16	<sup>2/</sup> 0.82	1.32	2.69	1.06	---	
36 Eggplants.....	Bushel	.77	---	---	---	.31	---	
Cantaloups.....	88-lb. crate	---	---	1.41	1.99	3.11	2.54	
Strawberries.....	12-pt. flat	.83	.93	2.09	.59	---	.37	

<sup>1/</sup> Except for tomatoes, preharvest costs are assessed against export production only. Domestic production of some crops exceeds the export portion, but revenue on domestic sales generally is little above costs of containers and shipment.

<sup>2/</sup> Immokalee area.

## MARKETING FRESH WINTER PRODUCE

Unlike those farmers whose activities revolve around a relatively leisurely production-harvesting-storing sequence, fresh vegetable growers cannot wait to make marketing decisions because of the perishable nature of their product. Some of the most anxious moments in the fresh produce industry come at harvest time when growers must make urgent decisions. The basis for proceeding with harvesting may seem simple--the expectation of a price that will at least cover necessary out-of-pocket costs. But the market is often capricious, and market information may be misleading. Sometimes it seems right to harvest and sell when hindsight shows that it would have been less costly to abandon part or all of the crop. At times, market signals cannot be acted upon instantaneously because of problems of coordination and timing in carrying out marketing activities. Sufficient competent labor may not be immediately available, essential materials may be temporarily in short supply, or lack of transportation may cause shipping delays. To further aggravate the uncertainty of the outcome, prices of services and materials might shift unexpectedly in response to swiftly changing market pressures.

Once a crop is ready for marketing, growers worry about such problems in assessing their position in relation to other competitive production areas. More importantly, these difficulties, along with production problems, help shape decisions about continuing in the fresh produce business in the future. With growing pressure from Mexican imports, such decisions are being reviewed more carefully than ever by domestic producers.

From the standpoint of marketing, concern over imports of fresh winter produce from Mexico involves controversial issues centering mainly on the relative cost of packing and harvesting labor, cost of packing and shipping materials, and the cost of selling and shipping to market. Other issues are market sharing and the ability to provide assurance of supply.

### Local Marketing Routines

The vegetable industry around Culiacan has no formal local marketing mechanism. Instead of having a shipping point market within the area as is commonly the case in the United States, Culiacan produce is first marketed some 600 miles north at Nogales, Arizona.

The market was located in Nogales because this served the convenience of U.S. firms who earlier furnished most of the financial sponsorship and technical guidance and handled all marketing affairs. In recent years, Mexican growers have become less dependent on U.S. participation and have had a larger voice in marketing. Yet it appears that the convenience of getting shipments across the border, reworking loads, and scheduling shipments, and the advantages of simply being a part of an established market so far have been sufficient to offset advantages of starting an active f.o.b. in Culiacan. As time goes on, however, this may change. Mexican producers have welcomed visits from representatives of the U.S. food trade which seems to be encouraging U.S. firms to become more active in the area.

Apart from the extra marketing link of getting produce across the border to f.o.b. status in Nogales, the physical mechanics of marketing by producers in the Culiacan area are similar to those in South Florida. "Transfusions of know-how" from the United States have helped erase technical differences among production areas, leaving natural and economic factors to decide the competitive balance. Through exchange visits, industry leaders have become aware of this. With technical practices leveled or transferrable, it is only a step further to reckoning cost comparisons in terms of inputs and input prices. Domestic leaders have serious questions about cost differences as factors in the import situation.

Labor costs influence the harvesting-marketing phase of competitive relationships among producing areas, as well as the production phase. In 1967, Florida growers paid \$1.00 per hour, not including other incidental labor costs, for picking tomatoes; in 1968, the wage rate increased to \$1.15. In Mexico, the wage rate was \$1.82 per day in 1967, and in 1968 it was \$2.10. At these rates, wages for 2 hours in Florida amounted to more than the daily wage in Mexico.

On a packed-out basis for tomatoes, however, cost disparities, especially for picking, were not nearly as significant (app. table 61). The cost of labor for picking in Mexico was over a third as high as in Florida, even after including the Mexican domestic pack as a part of output. In contrast, the cost of packing labor differed by just about the wage differential because labor requirements in the modern and well designed Mexican packing houses were about the same as in Florida.

There are two apparent reasons why picking costs in Mexico are high relative to wage rates. Daily output per worker is lower because laborers are less closely supervised than in the United States. And it is the Mexican custom to pay the full daily wage whether the workers are fully occupied with picking all day or not.

For comparable items, packing materials for vine-ripe tomatoes in Mexico generally were costlier than in the United States. But nearly two-thirds of Mexican exports are packed in three-layer cartons, which are larger than the 20-pound pack popular in Florida, and, therefore, differ less in cost per pound than in cost per container.

Cost of all harvesting and packinghouse activities for Mexico was a little over 60 cents per 20 pounds, or less than half as much as in Florida. Mexican tomatoes incurred an additional marketing cost of \$1.02 per 20-pound pack (including transportation and U.S. customs clearance) before they could be marketed at Nogales, Arizona. Thus, total harvesting and marketing costs to comparable stages of marketing, f.o.b. basis, were 35 cents higher for Mexican tomatoes than for Florida tomatoes (table 5 and app. table 61).

Marketing costs for Florida mature-green tomatoes were even more favorable in relation to marketing costs for Mexican vine-ripe tomatoes. In 1967/68, a 40-pound box could be readied for f.o.b. sale for 28 cents less than 20

pounds of Mexico vine-ripes--although it should be remembered that mature-green tomatoes incurred other costs such as holding room costs that vine ripers did not, before reaching the retail store.

Mexican cucumbers were more heavily encumbered by marketing cost than vine-ripe tomatoes. The estimated cost of harvesting, packing, and exporting a bushel of Mexican cucumbers was about \$4.00 f.o.b.--double the cost for Florida (table 5 and app. table 62). Mexican peppers fared some better, but still exceeded the domestic cost by about \$1.30 per bushel, about one and three-fourths times the domestic cost (table 5 and app. table 63). Mexican eggplants, cantaloups, and strawberries also faced significant marketing costs before achieving f.o.b. status across the U.S. border (table 5 and app. tables 64-66).

The disadvantages in marketing costs offset much of the advantage that Mexican producers have over U.S. growers from lower production costs, particularly for products marketed simultaneously.

Table 5.--Winter produce: Estimated total cost of harvesting, packing, and selling specified crops F.O.B. shipping point by areas, 1967/68

Crop	Container	South Florida	Texas, Rio Grande Valley	Northwest Mexico <u>1/</u>	Southwest Mexico <u>2/</u>
Tomatoes:					
Vine-Ripe	20-lb. lug	\$1.29	--	\$1.64	--
Mature-Green.	40-lb. lug	1.36	\$1.79	--	--
Cucumbers.....	Bushel	1.99	1.85	3.96	--
Peppers.....	Bushel	1.69	1.71	2.98	--
Eggplant.....	Bushel	1.19	--	2.00	--
Cantaloup.....	88-lb. crate	--	3.42	6.65	\$6.12
Strawberries....	12-pt. flat	1.84	--	--	2.24

1/ Duty paid, Nogales, Arizona.

2/ Duty paid, Laredo, Texas.

### Competition for Markets

In earlier years, imports of Mexican produce were confined mostly to markets west of the Mississippi. Since the sharp increase in imports, particularly of tomatoes, that began several years ago (app. fig. 16), Chicago appears

to have become the pivotal market. In 1965, Mexico supplied Chicago with 28 percent of the combined total of tomato unloads from Mexico and Florida. Mexico's share increased to 39 percent in 1967.

Although the pressure for larger shares farther east has been intermittently up and down and therefore seemingly less intense, there are signs that Mexican tomato shipments are making deeper and deeper penetrations into eastern U.S. and Canadian markets. The increasingly frequent appearance of Mexican tomatoes in markets along the eastern seaboard could be a hint of the weakening hold domestic growers have on these markets over the long run.

Looking at trends in Mexico's market shares over a period of time alone can lead to misjudgements about its immediate (day-to-day or week-to-week) potential market strength.

The relative competitive strengths of Florida and Mexican growers are different in the short-run and in the long-run. In vine-ripe tomatoes, for example, Mexico seems to have a sizable long-run advantage in production cost which becomes an advantage in total costs in some westerly markets (table 6). But Florida has lower marketing cost to Eastern markets. This means that in the short-run, once tomatoes are produced, Florida can push shipments into certain markets at a price prohibitive to Mexico though the net return above marketing costs may not cover production cost. At such prices, Mexico would not even be able to recover marketing costs.

The ability to compete within a season but to produce only at a near survival level from season to season underlies the gradual weakening of Florida's position in the winter fresh tomato industry.

It takes \$2.25 to cover harvesting and marketing costs and truck a 20-pound carton of tomatoes into Chicago from Nogales, Arizona. From Pompano Beach, Florida, it can be done for \$1.79. This short-term cost gap of \$.46 means that with supplies of tomatoes on hand, Florida can keep shipping into Chicago while Mexico has to withhold shipments when returns fall below \$2.25 delivered. Returns for the lower qualities are the first to fall below the critical price, which means that Mexico must confine its shipments to fancier selections. The cost gap is much wider into New York, about \$.83, further limiting Mexico's marketing opportunities to the higher quality tomatoes and relatively extending Florida's choices (table 7). Shipping distance dissipates Florida's marketing cost advantages on the west coast, so that Mexican supplies predominate in San Francisco and other important western market centers.

Because of Florida's short-term advantage, a supply explosion in Mexico could turn a potentially profitable season into one of loss for Mexican producers. So Mexico has proceeded to increase production profitably but at a rate that would seem restrained in view of its \$511 per acre production cost compared to \$1,518 for Florida. Mexico's increase of production has been slowed somewhat by uncertainty in predicting the year to year levels of Florida's supplies.

Table 6.--Winter produce: Estimated total cost of production, harvesting, marketing, and delivery to specified destinations, 1967/68

Crop and producing area	Container	Destination		
		New York	Chicago	San Francisco
		<u>Dollars per container</u>		
Tomatoes, vine-ripe	20-lb. lug			
Florida.....		2.58	2.63	2.93
Mexico.....		<u>2.88</u>	<u>2.56</u>	<u>2.34</u>
Difference, Mexico minus Florida.....		.30	-.07	-.59
Cucumbers	Bushel			
Florida.....		4.25	4.30	4.95
Mexico.....		<u>7.02</u>	<u>6.33</u>	<u>5.87</u>
Difference, Mexico minus Florida.....		2.77	2.03	.92
Peppers	Bushel			
Florida.....		3.44	3.54	3.94
Mexico.....		<u>5.90</u>	<u>5.34</u>	<u>4.97</u>
Difference, Mexico minus Florida.....		2.46	1.80	1.03
Eggplant	Bushel			
Florida.....		2.80	2.90	3.30
Mexico.....		<u>3.99</u>	<u>3.41</u>	<u>3.02</u>
Difference, Mexico minus Florida.....		1.19	.51	-.28
Cantaloups	88-lb. crate			
Texas, Rio Grande Valley.....		7.20	6.41	6.91
Mexico.....		<u>12.77</u>	<u>11.73</u>	<u>11.03</u>
Difference, Mexico minus Texas.....		5.57	5.32	4.12
Strawberries	12-pt. flat			
Florida.....		3.06	3.11	3.37
Mexico.....		<u>3.42</u>	<u>3.14</u>	<u>2.95</u>
Difference, Mexico minus Florida.....		.36	.03	-.42

Based on data in tables 4 and 5, and app. table 67.

Table 7.--Winter produce: Marketing plus delivery costs from shipping points to specified destinations, 1967/68

Crop and shipping point	:	Container	Destination		
			New York	Chicago	San Francisco
			Dollars per container		
Tomatoes, vine-ripe	:	20-lb. lug			
Florida.....	:		1.74	1.79	2.09
Nogales, Arizona.....	:		<u>2.57</u>	<u>2.25</u>	<u>2.03</u>
Difference, Nogales	:				
minus Florida.....	:		.83	.46	-.04
Cucumbers	:	Bushel			
Florida.....	:		3.09	3.14	3.79
Nogales, Arizona.....	:		<u>5.96</u>	<u>5.27</u>	<u>4.81</u>
Difference, Nogales	:				
minus Florida.....	:		2.87	2.13	1.02
Peppers	:	Bushel			
Florida.....	:		2.49	2.59	2.99
Nogales, Arizona.....	:		<u>4.60</u>	<u>4.04</u>	<u>3.67</u>
Difference, Nogales	:				
minus Florida.....	:		2.11	1.45	.68
Eggplant	:	Bushel			
Florida.....	:		2.04	2.14	2.54
Nogales, Arizona.....	:		<u>3.68</u>	<u>3.10</u>	<u>2.71</u>
Difference, Nogales	:				
minus Florida.....	:		1.64	.96	.17
Cantaloups	:	88-lb. crate			
Texas, Rio Grande	:				
Valley.....	:		5.79	5.00	5.50
Nogales, Arizona.....	:		<u>9.66</u>	<u>8.62</u>	<u>7.92</u>
Difference, Nogales	:				
minus Texas.....	:		3.87	3.62	2.42
Strawberries	:	12-pt. flat			
Florida.....	:		2.23	2.28	2.54
Laredo, Texas.....	:		<u>3.05</u>	<u>2.77</u>	<u>2.58</u>
Difference, Laredo	:				
minus Florida.....	:		.82	.49	.04

Based on data in table 5 and app. table 67.

Surviving competition is a matter of concern both to the mature-green tomato industry and the vine-ripe tomato industry in southern Florida, but for different reasons. At any level of marketing, costs for mature greens, are lower than for Mexican vine ripers. Moreover, alongside Florida vine ripers, Florida mature greens have much lower short-term costs than Mexican vine ripers. Yet, mature greens have been giving way to vine ripers in the market (app. table 68). The reason presumably stems from differences in demand. Mature greens usually bring lower prices than vine ripers f.o.b. and in the large wholesale markets--considerably lower at times (app. figs. 17 and 18).

Mexican strawberries, though less important economically than tomatoes, have been more competitive during the domestic off-season.

They are imported in volume during the winter, but imports begin tapering off by midspring as supplies primarily from California start coming in. Mexican berries, notwithstanding the fact that they incur higher marketing costs than Florida berries, have a commanding place in major eastern U.S. markets (app. figs. 21-23). This is partly because the Mexican crop serves a double purpose--for fresh market and for processing. The top of the crop can be marketed as fresh berries (against crop-average berries from domestic sources). The processing alternative furnishes Mexican shippers with a flexible fresh market supply. Berries that would normally be processed when the fresh market is weak are a ready source of supply when the market is receptive.

Mexican cantaloups encounter less competition for the early market than do strawberries. By midspring, a scramble for market shares develops when supplies appear from California, Texas, and Arizona. Later on, in late spring, Mexican shipments again assume a lead. Mexico furnishes cantaloups to markets throughout the United States during the early season. It does so, however, at a cost which domestic suppliers meet easily later on (app. figs. 24, 25).

Florida cucumbers, supplemented by offshore supplies, share the winter marketing season with Mexican. So far, supplemental shipments from offshore have enabled people who handle Florida cucumbers to resist market expansion by Mexico. By spring, Florida takes control. Looking at the comparative costs for Florida and Mexico, this is understandable. The cost disadvantage is greater for Mexican cucumbers than tomatoes and helps explain why Mexican cucumbers haven't gained a larger share of the market.

The markets for Mexican peppers and eggplant are confined primarily to western markets. Mexican exports have been increasing but Florida's advantage in low growing costs and Mexico's disadvantage in high exporting costs to eastern markets have been greater for these products than for tomatoes and strawberries (app. figs. 27, 28).

#### Marketing Strategy and Demand

Since 1959, Mexican tomato growers have had a planned supply program that evolved from a program of quality supervision initiated in the mid-1950's. Each

year, at the direction of a grower marketing board, a staff of economists and statisticians for CAADES, the producer association for the state of Sinaloa, charts a production and marketing policy for tomato growers in the vicinities of Culiacan, Guasave, and Los Mochis. Elements shaping this policy are supply estimates for Florida, consumption and income trends in the United States and Canada, and analyses of price-supply relationships. From evaluations of these indicators and production capabilities in Mexico, goals are established in terms of hectares and expected production tonnage for the entire industry. A cutoff price is also recommended--\$2 per two-layer carton and \$2.25 per three-layer carton f.o.b. Nogales, Arizona, in the 1966/67 season (art. 12, app. IV)--as a signal to suspend shipments when the market is weak.

Domestic growers also have been interested intermittently in an industry regulated marketing program. Florida adopted a marketing order in 1955 but it was suspended in 1959 because the local industry was unable to agree on regulatory policy. Texas likewise chose a marketing order for tomatoes in 1959, but it too was soon abandoned.

U.S. growers' interest in group action remained nominal until the substantial increase in imports from Mexico in 1966. Florida growers reactivated their marketing order in the spring of 1968. Under the order, a market committee establishes minimum standards for grade and size of tomatoes to be shipped from Florida. While such standards are in effect, no tomatoes of lower grade or size may be imported to the United States market.

Knowledge about demand helps in assessing the appropriateness of alternative marketing policies. Civilian per capita marketings of fresh tomatoes in the United States have gained in recent years (app. table 70). With continued population growth and higher incomes, the market appears likely by 1970/71 to absorb as much as 9 to 10 percent more tomatoes than in 1968.

Estimates of relationships among prices and quantities marketed also indicate opportunities for industry growth. Price flexibilities derived from available data point to an elastic demand (app. table 71). CAADES estimates price flexibility at  $-.403$  (percentage decline in price accompanying a 1-percent increase in supply), and a University of Arizona estimate is  $-.278$ .<sup>10/</sup> Beyond the question of whether overall demand for the commodity is elastic or inelastic (i.e., revenue increases or decreases, respectively, with an increase in shipments), the estimates in app. table 71 open up some of the complexities in regulating the marketing of a heterogeneous commodity.

An increase in total marketings of vine-ripe tomatoes in most cases coincides with larger negative price responses among the smaller sizes than among larger sizes. More importantly, changes in the quantity of the larger sizes seem to affect their own prices less than prices of smaller sizes.

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<sup>10/</sup> Analysis De La Situacion Agricola De Sinaloa, CAADES Bul. 49, 1967. Robert Arthur Gehring, The United States Demand for Fresh Winter Vegetable Imports from Mexico and Some Economic Implications for the State of Sinaloa--Unpublished Masters' Thesis, University of Arizona, 1968.

The relationships in appendix table 71 also imply something about the nature of competition between vine-ripe and mature-green tomatoes. The quantities marketed of the smaller vine-ripe tomatoes, in particular, apparently affect the prices of mature-green tomatoes, but the supply of only the larger mature greens show any tendency to affect the price of vine ripers.

These demand measurements agree in general with the common belief that the smaller sizes of tomatoes are the less economically attractive components of supply, and should be discarded under managed marketing. The analysis does imply, however, a flaw in the reasoning leading up to the belief, even if the thinking does give the right answer. Instead of the less desirable tomatoes ruining the market for the choice sizes, plentiful supplies of the larger sizes seem to literally push out the smaller ones. Tomatoes with poorer demand ratings simply fail to compete in markets weakened by abundant supplies.

A normal reaction to the apparent consensus that demand for fresh winter tomatoes is elastic would be that neither Florida nor Mexico should follow restrictive marketing policies. The price and size interrelationships in app. table 71 raise some doubts about the universality of this conclusion. Moreover, some low value tomatoes simply slip through the packing and selling operation without paying their way. A regulation that would prevent this from happening would reduce costs and bring some gain from price increases for the balance of supply.

It is possible, though not quite so evident, that withholding lower valued packs might pay even when price exceeds packing and selling costs. This could happen, for example, when the low value portion of the supply might contribute little to total revenue, but impose an undue drag on average price. Relatively small percentage increases in the prices of higher valued supply components would more than offset the revenue lost by withholding the low value portion of supply. Thus, it might be advisable to restrict supplies of small tomatoes even when demand as a whole appears quite elastic. The low-side first approximation of the needed percentage increase in price would be established by the size of the percent of expected loss in total revenue (app. V).

The price flexibilities and cross-flexibilities in app. table 71 relating to changes in prices of larger size tomatoes accompanying changes in marketings of smaller sizes, while fractional and spotty, imply the chance of a sufficient boost in revenue from larger sizes to warrant the exclusion of smaller tomatoes from supply in times of low prices. As an illustration, calculations for the 1966/67 season based on app. table 71 imply that removal of 7x7 and 7x8 vine ripers from marketings would have increased the average price of the remainder of supply (vine ripers and mature greens) by 12 percent, although only about a 2-percent increase in price would have offset the loss in revenue from not marketing these sizes.

Although it can't be demonstrated from the analysis, there is reason to believe that prices of larger sizes would increase as prices of the remaining intermediate sizes increased.

At this point, it is appropriate to look at another facet of managed marketing. The size distributions for Florida and Mexico vine-ripe tomatoes, for the 1966/67 season at least, were quite different. About 75 percent of the Mexico pack fell in the 6x6 or smaller category (app. table 72). Only 38 percent of the Florida pack was in this range of sizes. It follows that marketing policies that involved size manipulation would have different implications for the two supply areas.

Although the economics of size is an important factor from the standpoint of demand, it should be realized that differences in the packs from separate areas of a grade and size structured commodity like fresh tomatoes affect the capabilities of supplying specific market needs. The appropriate marketing strategy for a given area depends partly on the size distribution of the crops in the field during the marketing season. Once the marketing season begins, it is a simple matter of who can harvest, package, and deliver tomatoes of similar grade, size, and color into target markets at the lowest cost. From one production season to another, both growing and distribution costs play vital competitive roles.

An idea about the outcome of managed marketing of vine-ripe tomatoes by Florida and Mexico is provided by table 8 and figure 2. Recently, Mexico has exported about 60 percent of its saleable tomatoes. This amounts to its sending around 1,100, 20-pound equivalents per acre to United States and Canadian markets, compared with Florida's marketings of 1,800 units per acre. The unrestricted marketing approach in Florida resulted in Florida growers marketing more tomatoes per acre than Mexican growers were able to ship per acre under the managed export marketing program followed by Mexican producers.

With unrestricted marketings of vine-ripe tomatoes, Florida covers all costs at a price of \$2.58 per 20-pound carton in New York, while Mexico requires \$2.88 (table 8 and fig. 2). Equivalent costs f.o.b. shipping points in South Florida and Nogales were \$2.13 and \$1.95, respectively. With its marketings decreased unilaterally to a level between 30 and 40 percent below full yield, Florida's required price at New York would rise above Mexico's and the difference in f.o.b. costs would widen by 35 to 55 cents. In Chicago and markets farther west, Florida is at a disadvantage at full yield, and the disadvantages would increase with any reduction in marketings per acre.

Consider a program which would reduce both Florida and Mexican tomato marketings per acre by the same percentage, say, 40 percent. Both would have the same proportional increase in growing costs per unit marketed, but Florida starts at a higher cost per unit, and her absolute increase would be greater (table 4). Thus, at a 40-percent reduction, Mexico would become competitive at New York, besides increasing her margin of advantage at Chicago and farther west.

If Mexico unilaterally decreased her marketings per acre, a 20-percent reduction would erase her advantage at Chicago.

Table 8.--Florida and Mexican vine-ripe tomatoes: Total production, marketing costs F.O.B., and delivery costs to New York, Chicago, and San Francisco 1/

Marketing level (percent below full yield)	Total F.O.B. cost		Total cost delivered		Total cost delivered		Total cost delivered	
			to New York from:		to Chicago from:		to San Francisco from:	
	Florida	Mexico	Florida	Mexico	Florida	Mexico	Florida	Mexico
	----- Dollars per 20-pound carton -----							
0.....	2.13	1.95	2.58	2.88	2.63	2.56	2.93	2.34
-10.....	2.23	1.98	2.68	2.91	2.73	2.59	3.03	2.37
-20.....	2.34	2.02	2.79	2.95	2.84	2.63	3.14	2.41
-30.....	2.49	2.08	2.94	3.01	2.99	2.69	3.29	2.47
-38.9 <u>2/</u> .....	2.67	2.14	3.12	3.07	3.17	2.75	3.47	2.53
-40.....	2.70	2.15	3.15	3.08	3.20	2.76	3.50	2.54

1/ The increase in costs from one marketing level to the next in this table are in preharvest costs. Preharvest costs with the full yield of 1,800 cartons were \$0.84 in Florida and \$0.31 in Mexico (table 4). Harvesting and marketing costs are from table 5 and appendix table 67.

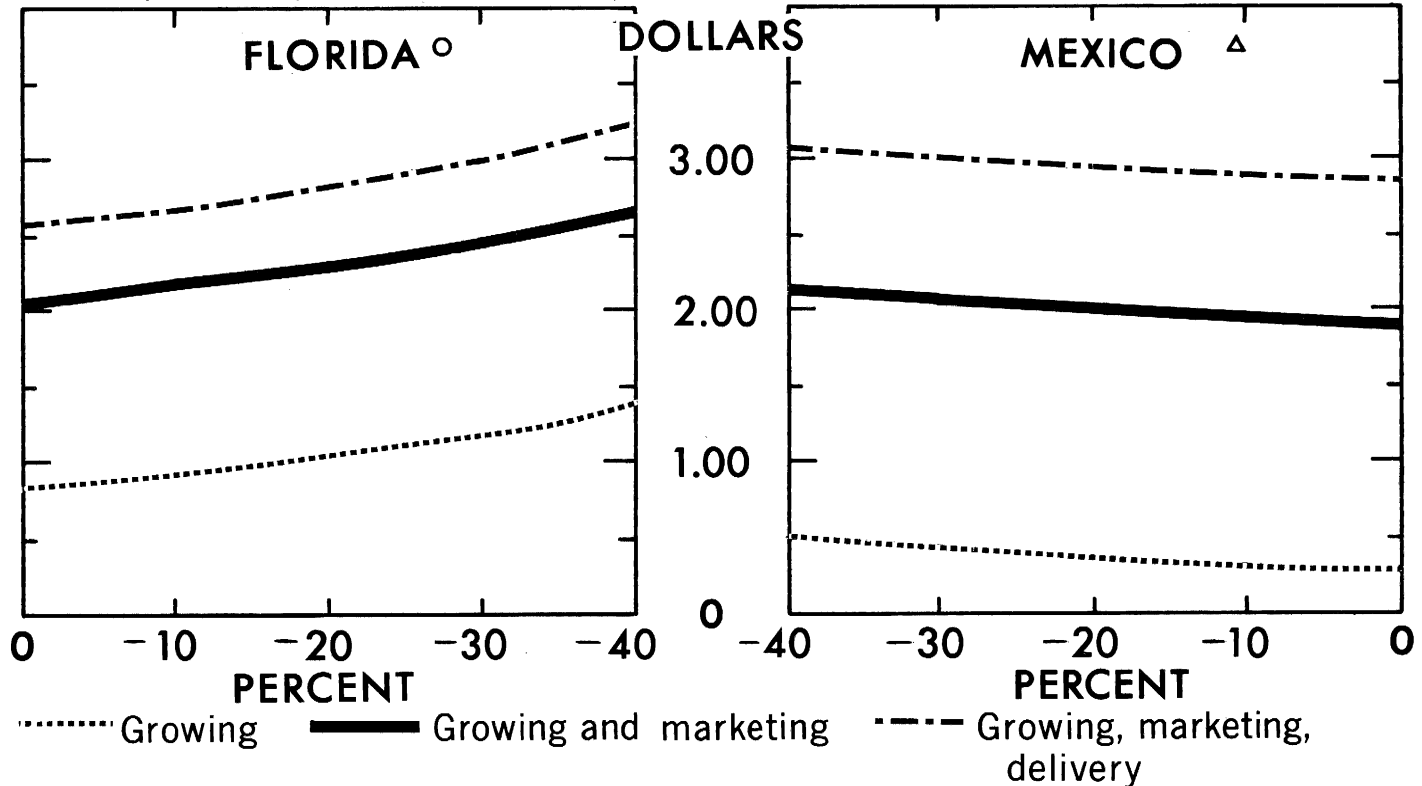
2/ Mexican export marketing rate, 1966-67 season.

# FLORIDA AND MEXICO VINE-RIPE TOMATOES

Comparative Costs for Growing, Marketing, and Delivering to N.Y. City  
for Various Marketed Yields

Marketed Yield per Acre (20-lb. cartons)

1,800 1,620 1,440 1,260 1,080 1,080 1,260 1,440 1,620 1,800



○ GROWING COST: \$1,517.63; AVG. MARKETED YIELD: 1,800 CARTONS

△ GROWING COST: \$551.02; AVG. MARKETED YIELD: DOMESTIC=700 CARTONS, EXPORT= 1,100 CARTONS, TOTAL= 1,800.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5907-69(2) ECONOMIC RESEARCH SERVICE

Figure 2

Calculations similar to the foregoing could be made for each of the other products in the study.

Costs of producing Florida mature-green tomatoes and marketing them f.o.b. are much less than costs for vine ripers in both Mexico and Florida (tables 4, 5). But vine ripers are taking a larger share of the market despite the cost difference. This, however, does not necessarily mean that mature greens would disappear from the market under managed marketing. Small vine ripers seem to compete fairly strongly with large mature greens. Removal of the smaller vine ripers (and smaller mature greens) from the marketed supply would tend to raise prices of both mature-green and vine-riper tomatoes.

Florida has no marketing orders for the other products dealt with in the study.

In Sinaloa, Mexico, there has been some talk about organizing a formal marketing program for cucumbers and perhaps other commodities similar to the one for tomatoes, but at the time of the study none had been organized.

Strawberry producers in the Zamora area practiced managed marketing through acreage control, but the program lacked much of the sophistication achieved by tomato growers in Sinaloa.

For the 1968 season, cantaloup growers in the Apatzingan area turned all packing and selling functions over to their local association. The association contracted packing to local packer-handlers who previously were independent, and retained brokers to handle sales. Year-to-year industry volume is managed through acreage control.

Tables 6, 7 provide information on the within-season and year-to-year competitive positions of Mexican and domestic cucumber, pepper, eggplant, cantaloup, and strawberry industries. With appropriate interpretation (i.e., allowance for certain seasonal periods when supplies do not conflict) these tables help visualize how things might work out if each industry imposed a rigorous marketing program.

In the contest for markets, some of the other circumstances that require consideration relate to the purely physical process of marketing and to attitudes of firms in the receiving markets. With good scheduling of shipments through Nogales, packing houses around Culiacan are from 6 to 7 days from Chicago, and 7 to 8 days from New York. South Florida shipping points are 2 to 3 days away from New York and 3 to 4 from Chicago. The longer in-transit time for shipments from Mexico introduces more uncertainty into the marketing program for that area. This is compounded by the necessity of coordinating and processing shipments at Nogales. Apparently it is not uncommon for brokers and shippers in Nogales to have to take care of some arrivals from Culiacan on a "ready or not" basis. Together, the extended in-transit time and related problems of communications and coordination increase the probability of shippers marketing by consignment--that is, of rolling a shipment to some terminal market broker and waiting to see what happens.

Looking at the receiver or terminal buyer, less in-transit time spells more convenience in supply procurement. The time factor through its relationship to freshness, shelf life, and general condition, so crucial to fresh produce, may have even more to do with market acceptance of produce from different areas. Shipping time probably accounts for such comments from buyers in Chicago and New York as "Mexican tomatoes arrive with too much color;" "they are soft;" "they won't hold up;" "Florida tomatoes are harder."

These arrival conditions, in part, develop aside from "goodness" or "badness" of packs as identified with the way they are put together in the production areas. Attention to grade, size, appearance, product uniformity, and to **other** quality features important to trade acceptance help establish the reputation of production areas. What happens between the production areas and the market further modifies these reputations.

Although a few buyers were critical of Mexican produce and mentioned the possibility of Mexican tomatoes being discounted if good Florida tomatoes were available, most of those talked to claimed to have no special problems with Mexican imports. They also took the position that for like quality there was no price discrimination. The to-be-expected market truism about the lack of discrimination, quality for quality, in a reasonably competitive situation evades the question concerning market reputation. Evidence closer to this point shows up in the way buyers ranked produce from different supply areas on the basis of trade acceptance (app. tables 73-76). Florida tomatoes received more of the votes for first place than tomatoes from other areas among wholesalers in both Chicago and New York and among wholesale market buyers (middlemen customers of wholesalers) in New York. Wholesale market buyers in Chicago favored California for first place. First place rankings for Mexican tomatoes and any other of the produce items considered were few in both Chicago and New York.

Without pretending to fathom all of the subtleties that fashion buyers' opinions, it is suggested their preferences leaned toward producing areas that furnished them most of their supplies. As some buyers and buying brokers in Nogales summed it up--the western market is accustomed to Mexican produce; the eastern market is accustomed to Florida produce.

Despite these attitudes, however, the changing distribution patterns for Mexican produce, especially for tomatoes, is a reminder that markets are not static. The basic reason, no doubt, for the growing importance of Mexican produce in U.S. markets is contained in the comment of a Chicago wholesaler that: "The quality, grade and sizing of Mexican produce has steadily improved over the past 5 years. They are highly competitive now."

And **probably** without question, the reason he and others feel this way is because the Mexican produce industry chose to build into its marketing plan a definite unified concern for market image.

## STATUS OF THE INDUSTRY FROM PRESENT TO FUTURE

Events of the past decade have narrowed the choice of supply sources for winter produce, especially for tomatoes, to Florida and Mexico. It seems unlikely that an equilibrium between these areas has been reached, but the point at which market shares will become stabilized cannot be predicted with confidence.

Since weather probably will not be any more or any less accommodating to either area in the future than in the past, it may be thought to be neutral in shaping future industry prospects. But it is not certain that the present situation represents industry's final adjustment to the weather factor.

Weather is not as favorable to winter vegetable production in South Florida as it is in the area around Culiacan, Mexico. Growers in South Florida producing areas have developed drainage facilities and have established windbreaks to mitigate the effects of drops in temperature and are searching for other methods of dealing with these risks.

However, the rain-induced tomato blight epidemic around Culiacan in the spring of 1968 may indicate that Mexican producing areas are less free of weather related problems than had been thought. The outcome of the race in efforts to find technological solutions for the weather problems of the two areas may have an important effect on the future competitive balance.

Land and water resources will not decide the destinies of the two areas any time soon, since both areas are reasonably well endowed.

Labor supply is a more immediate problem. Rising wages and the shifting employment pattern imply that the labor situation in South Florida is tightening.

Any stringency in the supply of good seasonal harvesting labor would be felt most by tomato growers. Tomatoes require as much harvesting labor during winter months as all other vegetables together (except celery and beans), or around 40 percent of industry needs (app. table 31). The tomato sector depends upon such a large share of total industry labor requirements that it is in a competitive squeeze from both the labor and the product side. It must compete in the labor market with neighboring vegetable sectors not facing product competition from Mexico and also contend with competition from Mexico in the product market.

The Culiacan, Mexico, area has more than enough people to accommodate a large industry expansion, but it would take some time to convert inexperienced workers into useful members of the labor force. Florida apparently has a related difficulty--some growers indicate that competent laborers are becoming increasingly scarce.

Wage rates around Culiacan have been rising, but by 1967/68 these were only between one-fifth and one-fourth those in Florida. For some time to come, government policy rather than competition for labor will have most influence on wage rates for common labor in Mexico.

It is possible that competition in the labor market may soon play a stronger role in wage determination in Florida. If labor becomes more organized, it may become more restrictive. Present workers tend to have little opportunity to change from their present employment, so they and producers are mutually dependent. But the independence is not absolute, as other employment opportunities could open.

Some tomato growers in South Florida, and to a lesser extent, cucumber and pepper growers, have few alternatives for their skill and capital. If each vacated acre of vine-ripe tomatoes were to be replaced by 11 additional acres of snap beans in the Palm Beach East area or 10 more acres of sweet corn in the Palm Beach West area (replacement ratios implied by data in app. table 77), the entire vegetable industry would be shaken. The vegetable industry, being sufficiently fluid to preserve competitive balance among enterprises, would not make such shifts in a short time.

These short-term limitations on alternatives for both producers and labor suggest that despite increasing pressure from Mexican competition, growers who are unable or unwilling to go elsewhere and laborers in a similar predicament will be instrumental in keeping a tomato industry in South Florida a while longer.

The attitudes of the financial establishment and those of the highly mobile producer element are two other things which have influenced the trends in Florida that may continue to operate. Probes are always under way for promising offshore and South American supply outposts. This has been to a certain measure successful for cucumbers. Efforts for tomatoes and peppers and other commodities have had less success so far. If opportunities are found, more funds and managerial talent not particularly concerned with loyalty to the production area will flow through Nogales into the Culiacan area and further intensify competition from that direction. Development of Yucatan may become more of a factor than it was through 1968.

Some of the pioneering firms in Nogales and their associates in the terminal markets sense the fluidity of the situation. They mention present limitations on the number of technically competent growers and supporting labor, some lingering problems with plant disease, and shortcomings of currently used plant varieties as the main barriers to expansion of vegetable production around Culiacan. Otherwise, in their view, the possibilities are wide open. Their speculations may turn into reality because these difficulties might be solved over a period of time.

Those willing to speculate further envision that economic and technological breakthroughs in air transportation could result in the establishment of produce industries in Central and South America, and then Mexico itself would face new competition.

Mexico, however, seems to be assured of an increasingly important role in the winter produce industry. Students of the potential for Mexican agriculture predict expansions for all of the currently favorite export products. In the case of fresh tomatoes, even the optimistic estimates of a study completed in the early 1960's are falling short of accomplishments. Exports already are running above the 168,000-ton estimate for 1970 (app. table 78). This level of tomato output requires less than 10 percent of the 300,000 acres being developed near Culiacan.

Regulations adopted by Florida growers under the newly reactivated marketing order will apply also to imports from Mexico, and can influence the relative supply positions of the two industries. Tomato size limitations imposed on Florida shipments in January 1969, changed the structural pattern of Mexican exports sufficiently to cause a relatively larger reduction in the proportion of Mexican production entering the United States. The combined reductions in shipments improved prices for both areas, but the relatively larger reduction in imports from Mexico increased the pro-rata cost of each unit of Mexican tomatoes entering the U.S. market relatively more than the per unit cost of the Florida pack, altering their competition positions.

Except for fresh strawberries, the produce items considered in the study are not on the market in frozen form. Nor do developments in food processing technology indicate that any of competitive significance will be in the near future. Consequently, the full weight of furnishing winter and early spring supplies of these commodities to U.S. consumers will rest upon areas with naturally suitable growing conditions and upon the greenhouse trade. Possibly part of the benefit of the demand build-up will mean a net accrual to greenhouse tomato growers.

Prospects of a growing market for fresh winter tomatoes could mean more time for responses and adjustments by the Florida industry. For Mexico, it means an opportunity for continued expansion. Given the time to evaluate industry and market signals, Mexico likely will continue to increase its production in the next few years. Florida's production will probably continue to follow the fluctuating pattern of recent seasons but with some downward trend. However, production of vine-ripe tomatoes in Florida may become less important relative to production of the less costly mature greens.

Supplies from competitive offshore sources will probably help keep Florida strongly identified with the winter cucumber industry. Development of disease-resistant higher yielding varieties adapted to Mexican conditions would help to reduce costs and increase Mexico's importance as a supplier of cucumbers.

Production of Mexican peppers and eggplant for the West Coast market will likely increase. But for the near future, at least, Florida will retain a firm competitive position in central and eastern U.S. markets.

Continuing pressure from Mexican imports will probably discourage expansion in the Florida strawberry industry.

Mexico is uncontested in the winter and early spring cantaloup market. In the spring, after western domestic supplies become available, Mexico has difficulty competing. The competitive situation for Mexico in the spring cantaloup market is apparently worsening.

# APPENDIX I

Table 9.--Tomatoes: Fresh market, U.S. production and imports, 1956-67 1/

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	----- 1,000 cwt. -----											
<u>Florida</u>												
Winter .....	2,831	2,934	3,247	3,360	3,222	3,280	3,230	1,552	1,852	634	2,656	2,128
Early spring .....	3,218	3,125	2,691	2,520	2,440	2,294	2,360	2,195	1,838	1,546	1,700	2,464
<u>California</u>												
Early spring	273	232	429	400	504	525	718	710	943	897	788	714
<u>Texas</u>												
Early spring	128	108	368	307	452	1,026	897	580	1,260	1,060	946	896
Total U.S. winter and early spring..	6,450	6,399	6,735	6,587	6,618	7,125	7,205	5,037	5,893	4,137	6,090	6,202
Mexican imports .....	3,624	3,587	2,655	2,461	2,400	2,332	1,561	2,518	2,404	2,262	1,004	690
Other imports .....	35	19	35	31	20	30	201	609	222	383	191	260

1/ That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statis. Bul. Nos. 300 and 412 and Vg. 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968. Other data compiled from reports of the Bureau of the Census, U.S. Department of Commerce.

Table 10.--Cantaloups: Fresh market, U.S. production and imports, 1956-67 1/

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	----- 1,000 cwt. -----											
<u>Florida</u>												
Spring.....	90	90	120	88	77	68	75	72	86	72	56	129
<u>Texas</u>												
Spring.....	1,312	428	1,062	840	910	759	518	399	405	640	852	1,280
<u>Arizona</u>												
Spring.....	1,308	1,800	1,690	1,970	2,249	2,062	1,668	2,010	1,963	1,541	1,265	1,955
<u>California</u>												
Spring.....	1,175	912	611	550	942	1,068	988	1,188	1,812	1,130	981	1,310
Total U.S. spring	3,885	3,230	3,483	3,448	4,178	3,957	3,249	3,669	4,266	3,383	3,154	4,674
Mexican imports.....	1,172	1,365	1,465	1,301	1,104	978	796	793	562	439	497	519
Other imports.....	61	13	22	16	7	2	0	1	3	4	5	0

1/ That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statis. Bul. Nos. 300 and 412 and Vg. 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968. Other data compiled from reports of the Bureau of the Census, U.S. Department of Commerce.

Table 11.--Cucumbers: Fresh market, U.S. production and imports, 1956-67 1/

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	-----1,000 cwt.-----											
<u>Florida</u>												
Winter.....	---	---	---	---	---	---	---	---	49	---	239	100
Early spring.....	872	1,107	1,025	1,189	1,147	792	968	686	690	850	886	153
<u>Texas</u>												
Early spring.....	144	95	104	104	96	110	105	94	70	80	84	53
Total U.S. winter and early spring.....	<u>1,016</u>	<u>1,202</u>	<u>1,129</u>	<u>1,293</u>	<u>1,243</u>	<u>902</u>	<u>1,073</u>	<u>780</u>	<u>809</u>	<u>930</u>	<u>1,209</u>	<u>1,006</u>
Mexican imports.....	584	481	394	172	214	158	104	87	66	30	22	8
Other imports.....	281	233	364	342	398	432	339	574	285	421	398	428

1/ That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statistical Bulletin Nos. 300 and 412 and Vegetable 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968. Other data compiled from reports of the Bureau of the Census, U.S. Department of Commerce.

Table 12.--Peppers: Fresh market, U.S. production and imports from Mexico, 1956-67 1/

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	-----1,000 cwt.-----											
<u>Florida</u>												
Winter.....	746	582	682	644	564	662	653	451	493	155	620	593
Spring.....	700	812	558	640	704	475	586	643	339	428	414	563
<u>Texas</u>												
Spring.....	150	63	120	120	108	68	105	84	135	77	54	---
Total U.S. winter and spring.....	1,596	1,457	1,360	1,404	1,376	1,205	1,344	1,178	967	660	1,088	1,156
Mexican imports.....	278	246	177	131	162	173	129	222	197	152	93	59

1/ That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statistical Bulletin Nos. 300 and 412 and Vegetable 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968.

Table 13.--Eggplant: Fresh market, U.S. production and imports from Mexico, 1956-67 1/

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	----- 1,000 cwt. -----											
<u>Florida</u>												
Winter.....	129	110	139	104	116	129	98	54	92	12	135	88
Spring.....	144	150	136	140	135	126	154	150	115	113	126	127
Total U.S. winter and spring.....	273	260	275	244	251	255	252	204	207	125	261	215
Mexican imports..	72	57	44	34	27	21	19	18	20	14	6	---

1/ That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statis. Bul. Nos. 300 and 412 and Vg. 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968.

Table 14.--Strawberries: Fresh market, U.S. production and imports, 1956-67 <sup>1/</sup>

Area and season	1967	1966	1965	1964	1963	1962	1961	1960	1959	1958	1957	1956
	-----1,000 cwt.-----											
<u>Florida</u>												
Winter.....	176	209	298	238	166	135	78	65	31	21	54	73
<u>California</u>												
Spring <sup>2/</sup> .....	1,481	1,173	1,219	1,411	1,540	1,434	1,325	858	963	978	1,183	885
<u>Louisiana</u>												
Early spring.....	116	145	143	154	78	146	128	138	128	132	132	189
<u>Texas</u>												
Early spring.....	15	20	20	24	24	31	33	24	20	21	17	15
<u>Alabama</u>												
Midspring <sup>3/</sup> .....	13	16	15	17	16	19	21	20	20	20	17	18
Total U.S. winter, spring, and early spring.....	<u>1,801</u>	<u>1,563</u>	<u>1,695</u>	<u>1,844</u>	<u>1,824</u>	<u>1,765</u>	<u>1,585</u>	<u>1,105</u>	<u>1,162</u>	<u>1,172</u>	<u>1,403</u>	<u>1,180</u>
Mexican imports.....	205	117	58	41	34	9	6	6	1	0	---	---
Other imports.....	12	14	6	11	2	1	1	1	1	0	0	1

<sup>1/</sup> That portion of the production not marketed because of economic abandonment has been excluded in the U.S. data.

<sup>2/</sup> Classified as midspring prior to 1959.

<sup>3/</sup> Classified as early spring prior to 1960.

Sources: U.S. data compiled from Vegetables for Fresh Market, Statis. Bul. Nos. 300 and 412 and Vg. 2-2(67), Statistical Reporting Service, U.S. Department of Agriculture. Mexico data from Fruits and Vegetables, U.S. Imports from Mexico, Foreign Agricultural Service, USDA, April 1968. Other data compiled from reports of the Bureau of the Census, U.S. Department of Commerce.



Table 16.--Fruits and vegetables: Value of U.S. imports (for consumption) from Mexico, 1956-67

Year	Fruits and preparations (including melons)								Vegetables and preparations			Total fruits and vegetables
	Fresh			Processed				Total	Fresh	Pro- cessed	Total 1/	
	Fruits	Melons	Total	Fruit juices	Citrus oils	Other	Total					
----- 1,000 dollars -----												
1956.....	1,835	3,327	5,162	186	766	3,327	4,279	9,441	8,600	866	9,466	18,907
1957.....	2,994	2,925	5,919	35	1,727	3,144	4,906	10,825	11,454	268	11,722	22,547
1958.....	3,483	3,296	6,779	138	1,955	4,052	6,145	12,924	25,559	244	25,803	38,727
1959.....	3,712	4,812	8,524	371	847	4,479	5,697	14,221	25,485	334	25,819	40,040
1960.....	2,128	6,706	8,834	1,200	906	6,374	8,480	17,314	27,458	534	27,992	45,306
1961.....	3,004	5,498	8,502	1,346	1,723	6,763	9,832	18,334	17,666	625	18,291	36,625
1962.....	2,957	5,848	8,805	865	2,659	7,361	10,885	19,690	25,820	1,154	26,974	46,664
1963.....	6,388	6,056	12,444	1,617	2,933	7,596	12,146	24,590	30,040	751	30,791	55,381
1964.....	7,308	8,163	15,471	3,961	1,337	10,152	15,450	30,921	35,711	615	36,326	67,247
1965.....	6,147	8,958	15,105	744	3,789	12,113	16,646	31,751	40,259	1,054	41,313	73,064
1966.....	6,568	7,436	14,004	271	4,018	20,443	24,732	38,736	66,809	1,948	68,757	107,493
1967.....	8,503	7,595	16,098	230	5,813	14,572	20,615	36,713	59,962	2,921	62,883	99,596

1/ Excludes dried beans and peas.

Source: Fruits and Vegetables, U.S. Imports (for consumption) from Mexico, Foreign Agricultural Service, U.S. Department of Agriculture, April 1968.

Table 17.--Fresh vegetables, cantaloups, and strawberries: U.S. imports (for consumption) from Mexico, 1956-67

Year	Quantity													Frozen straw- berries 1/
	Beans, green	Cu- cumbers	Egg- plant	Garlic	Onions	Peas	Peppers	Squash	Tomatoes	Other	Total vegetables	Canta- loups	Straw- berries	
	-----1,000 pounds-----													
1956....	3,543	827	42	6,410	16,778	5,971	5,932	41	69,005	41	108,590	51,898	---	11,250
1957....	6,561	2,205	601	7,714	15,144	4,851	9,314	468	100,430	1,468	148,756	49,747	---	13,709
1958....	6,841	3,022	1,401	12,272	31,413	6,114	15,213	884	226,241	1,788	305,189	43,857	4	14,367
1959....	8,642	6,606	1,989	8,187	12,737	3,808	19,708	1,588	240,355	2,151	305,771	56,222	51	14,064
1960....	6,747	8,743	1,799	12,544	17,217	4,905	22,183	850	251,822	1,788	328,598	79,280	562	25,017
1961....	9,386	10,392	1,899	6,976	29,708	94	12,854	1,075	156,070	1,887	230,341	79,551	579	29,817
1962....	6,376	15,835	2,136	9,059	42,212	4,137	17,282	1,256	233,216	2,846	334,355	97,796	895	32,281
1963....	8,506	21,378	2,671	6,853	35,321	5,298	16,244	1,823	239,965	3,683	341,742	110,427	3,412	34,550
1964....	7,523	17,226	3,388	6,690	31,964	5,102	13,078	2,564	246,122	4,583	338,240	130,062	4,092	39,720
1965....	8,255	39,370	4,426	6,968	39,312	4,702	17,672	5,525	265,459	6,089	397,778	146,532	5,791	51,796
1966....	6,112	48,076	5,686	6,248	50,530	5,767	24,591	5,057	358,743	13,603	524,413	136,507	11,747	82,825
1967....	7,162	58,412	7,186	9,160	41,407	4,848	27,799	11,129	362,354	13,329	542,786	117,218	20,499	72,693
	Value													Frozen straw- berries 1/
	Beans, green	Cu- cumbers	Egg- plant	Garlic	Onions	Peas	Peppers	Squash	Tomatoes	Other	Total vegetables	Canta- loups	Straw- berries	
	-----1,000 dollars-----													
1956....	347	98	4	510	1,016	448	616	3	5,555	3	8,600	2,620	---	1,579
1957....	711	244	56	776	908	348	957	38	7,355	61	11,454	2,301	---	1,416
1958....	744	309	145	1,371	1,737	443	1,681	81	18,952	96	25,559	2,161	1	1,719
1959....	948	596	227	1,066	1,104	273	2,089	126	18,927	129	25,485	2,858	8	1,747
1960....	751	735	197	1,383	1,035	375	2,311	61	20,476	134	27,458	4,023	43	3,233
1961....	1,100	671	187	746	1,409	345	1,304	83	11,623	198	17,666	3,964	120	3,715
1962....	713	922	198	1,404	2,753	302	1,825	99	17,364	240	25,820	4,460	142	4,121
1963....	1,266	1,494	182	1,272	1,906	465	2,205	172	20,706	372	30,040	4,858	421	4,374
1964....	1,128	1,324	307	865	1,705	433	1,951	317	27,355	326	35,711	6,686	513	5,679
1965....	1,019	2,843	388	962	2,158	642	2,024	414	29,425	384	40,259	7,413	845	7,805
1966....	951	3,638	481	912	3,097	783	3,702	546	52,015	684	66,809	5,895	2,048	15,265
1967....	1,040	4,518	565	1,538	2,776	778	4,293	1,149	42,607	698	59,962	6,133	3,180	9,991

1/ Prior to September 1963, classified as "berries, frozen, NES." However, this category is believed to have consisted almost entirely of frozen strawberries.

Table 18.--Apparent consumption of fertilizers, Mexico, selected years, and projection to 1970

Year	Apparent consumption				Output		Imports		
	Total	Nitrogen	Phosphate	Potash	Nitrogen	Phosphate	Nitrogen	Phosphate	Potash
	-----1,000 metric tons-----								
1950.....	12.4	8.8	3.6	---	0.9	3.5	7.9	0.1	---
1955.....	78.5	50.8	22.1	5.6	14.8	14.6	36.0	7.5	5.6
1958.....	148.9	94.0	36.3	18.6	18.0	15.3	75.9	21.1	18.6
1960.....	196.7	138.2	46.5	12.0	17.4	17.9	120.8	28.6	12.0
1963.....	308.2	228.6	62.2	17.4	122.2	54.8	106.4	7.4	17.4
Projection::									
1970.....	665.0	445.0	167.0	53.0	445.0	167.0	---	---	53.0

Sources: Nacional Financiera, S.A. Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

Table 19.--Apparent consumption of insecticides, Mexico, 1950-64 1/

Year	Total	Imports	Mixed domestically
-----1,000 metric tons-----			
1950.....	14.1	11.6	2.5
1951.....	24.8	18.4	6.4
1952.....	25.7	17.5	8.2
1953.....	37.8	17.1	20.7
1954.....	57.9	12.0	45.9
1955.....	97.8	27.5	70.3
1956.....	83.1	7.5	75.6
1957.....	96.2	5.4	90.8
1958.....	115.6	5.1	110.5
1959.....	114.9	2.8	112.1
1960.....	113.6	2.9	110.7
1961.....	101.4	3.1	98.3
1962.....	122.9	5.7	117.2
1963.....	121.7	2.8	118.9
1964.....	121.0	3.0	118.0

1/ In the form of mixes ready for application.

Sources: Bank of Mexico, Economic Research Department; Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

Table 20.--Ratio of tractors to harvested area, by region, Mexico, 1950 and 1960

Region	Tractors per 1,000 hectares harvested			Percentage of total number of tractors in--			
	1950	1960	Percentage increase	Other than ejido holdings		Ejido holdings	
				1950	1960	1950	1960
	Number	Number	Percent	Percent			
Total.....	2.6	5.1	96	83.9	79.8	16.1	20.2
North.....	4.6	9.3	102	89.4	81.2	10.6	18.8
Northern Pacific.....	5.2	8.8	69	86.4	79.0	13.6	21.0
Gulf.....	1.2	2.7	125	90.8	80.7	9.2	19.3
Southern Pacific.....	0.4	1.0	150	94.4	86.4	5.6	13.6
Center.....	1.3	2.9	123	87.6	76.0	12.4	24.0

Source: Agricultural censuses, Mexico.

Table 21.--Ratios of capital to land and to labor in agriculture, by region, Mexico, 1950 and 1960 <sup>1/</sup>

Region	Capital per hectare harvested <sup>2/</sup>			Capital per person employed <sup>2/</sup>		
	1950	1960	Percentage increase	1950	1960	Percentage increase
	1960 pesos	1960 pesos	Percent	1960 pesos	1960 pesos	Percent
Total.....	594	707	19.0	1,171	1,362	16.3
North.....	894	1,188	32.9	2,481	2,638	6.3
Northern Pacific.....	1,087	1,285	18.2	3,203	3,780	18.0
Gulf.....	476	386	-18.9	721	760	5.4
Southern Pacific.....	224	279	24.6	358	405	13.1
Center.....	408	521	27.7	711	938	31.9

<sup>1/</sup> Excludes public investments in the agricultural sector.<sup>2/</sup> Conversion to 1960 prices by means of deflator for gross fixed investment constructed by the Ministry of Finance, Bank of Mexico Working Group.

Sources: Agricultural censuses, Mexico; Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

Table 22.--Machinery in use on farms, Mexico, 1940, 1950, and 1960

Type of machine	Number of units			Percentage increase	
	1940	1950	1960	1940-50	1950-60
	<u>Thousands</u>			<u>Percent</u>	
Steel plows.....	725.7	1,134.6	1,286.3	56.3	13.4
Wood plows.....	925.5	1,128.3	1,100.0	21.9	-2.5
Planting machines....	26.5	59.9	92.6	126.0	54.6
Steel harrows.....	34.1	65.3	83.9	91.5	28.5
Cultivators.....	69.2	174.5	224.2	152.2	28.5
Harvesting machines..	5.0	7.5	10.0	50.0	33.3
Threshing machines...	2.0	3.6	9.2	80.0	155.5
Combines.....	---	---	3.8	---	---
Stationary machines:	---	---	3.4	---	---
Shellers.....	1.5	2.3	5.1	53.3	121.7
Hand shellers.....	3.7	4.8	8.6	29.7	79.2
Forage cutting and packing machines....	4.2	5.7	10.8	35.7	89.4
Carts.....	126.4	175.5	210.7	38.8	20.0
Trucks.....	6.0	17.9	40.4	198.3	125.7
Tractors.....	4.5	22.7	54.5	404.4	140.0
(Thousands of hp.)..	114.0	625.5	1,738.4	472.4	166.4
Other motors.....	9.0	14.3	18.2	58.9	27.3
(Thousands of hp.)..	131.1	119.0	135.3	-9.2	13.7

Sources: Agricultural censuses, Mexico; Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

Table 23.--Projection of the agricultural labor force, by region, Mexico, 1960, 1965, 1970, and 1975

Item	Projected number of persons				Projected increase in number of persons					Annual rate of growth 1/	
	1960	1965	1970	1975	1961-65	1966-70	1971-75	1961-70	1961-75	1961-65	1961-75
	<u>Thousands</u>									<u>Percent</u>	
Total agricultural labor force.....	6,086	6,558	7,070	7,623	472	512	553	984	1,537	1.5	1.5
Region:											
North.....	1,179	1,245	1,315	1,389	66	70	74	136	210	1.1	1.1
Northern Pacific..	469	510	555	603	41	45	49	86	135	1.7	1.7
Gulf.....	825	906	996	1,094	81	90	98	171	269	1.9	1.9
Southern Pacific..	1,142	1,261	1,392	1,537	119	131	145	250	395	2.0	2.0
Center.....	2,471	2,636	2,812	3,000	165	176	187	341	528	1.3	1.3

1/ Assuming the labor force remains a constant percentage share of total rural population: 35.3 per cent in 1960.

Sources: Census of population, 1960, Mexico; Tables 1-7, ch. 1, Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1968.

Table 24.--Composition and percentage share of the labor force in the agricultural sector, by region, Mexico, 1960

Labor force	Percentage share of labor force by region					
	Total	North	Northern: Pacific	Gulf	Southern: Pacific	Center
	-----Percent-----					
Total.....	100.0	100.0	100.0	100.0	100.0	100.0
Wage earners.....	24.1	36.6	46.1	25.8	22.2	16.4
In ejido holdings.....	8.6	10.9	13.4	10.7	7.7	6.7
In individual holdings: over 5 hectares.....	15.5	25.7	32.7	15.1	14.5	9.7
Nonwage earners.....	75.9	63.4	53.9	74.2	77.8	83.6
Ejido farmers.....	36.5	37.9	33.0	36.0	34.8	37.1
Owners of individual holdings:						
5 hectares or less...	26.8	6.3	5.5	19.2	33.4	37.5
Over 5 hectares.....	12.6	19.2	15.4	19.0	9.6	9.0

Sources: Agricultural census, 1960, Mexico; Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975, published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

Table 25.--Estimated employment and origin of seasonal hired agricultural workers in Dade, Fla., reporting area, by selected periods, 1963/64 season

Period	Dade, Fla., area						
	U.S. workers				Foreign workers		
	Total U.S.	Local	Intrastate	Interstate	Total foreign	British West Indies	Canadian and others
	Number	Number	Number	Number	Number	Number	Number
1963:							
August 1-15...	706	646	0	60	124	71	53
September 1-15:	1,202	734	324	144	123	65	58
October 1-15...	1,935	1,134	574	227	226	151	75
November 1-15..	3,731	1,534	1,665	532	273	192	81
December 1-15..	6,022	2,234	2,839	949	269	188	81
1964:							
January 1-15...	7,483	2,783	3,450	1,250	233	162	71
February 1-15..	6,455	2,605	2,600	1,250	233	162	71
March 1-15....	7,467	3,242	2,925	1,300	208	141	67
April 1-15....	4,925	2,680	1,795	450	514	443	71
May 1-15.....	1,204	585	534	85	221	173	48
June 1-15.....	651	601	0	50	99	55	44
July 1-15.....	601	551	0	50	99	59	40

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 26.--Estimated employment and origin of seasonal hired agricultural workers in Dade, Fla., reporting area, by selected periods, 1966-68 seasons

Period	Dade, Fla., area				
	U.S. workers				: Total
	Total U.S.	: Local	: Intrastate	: Interstate	
	: Total U.S.	: Local	: Intrastate	: Interstate	: foreign
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
1966:					
August 1-15.....	675	530	85	60	0
September 1-15....	2,500	1,865	385	250	0
October 1-15.....	2,700	2,010	415	275	0
November 1-15.....	3,200	2,242	530	428	0
December 1-15.....	3,900	2,642	530	728	0
1967:					
January 1-15.....	5,570	3,392	1,380	798	0
February 1-15.....	7,300	4,395	1,630	1,275	0
March 1-15.....	7,600	4,420	1,830	1,350	0
April 1-15.....	2,950	1,450	1,000	500	0
May 1-15.....	1,000	785	85	130	0
June 1-15.....	550	440	50	60	0
July 1-15.....	550	440	50	60	0
August 1-15.....	700	590	50	60	0
September 1-15....	2,500	1,910	390	200	0
October 1-15.....	3,200	2,420	410	370	0
November 1-15.....	4,500	3,120	850	530	0
December 1-15.....	6,500	3,720	2,050	730	0
1968:					
January 1-15.....	7,000	4,090	2,150	760	0
February 1-15.....	7,250	4,340	2,150	760	0
March 1-15.....	7,475	4,340	2,350	785	0
April 1-15.....	5,600	3,335	1,715	550	0
May 1-15.....	1,600	1,200	250	150	0

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 27.--Estimated employment and origin of seasonal hired agricultural workers in Lake Okeechobee, Fla., reporting area, by selected periods, 1963/64 season

Period	Lake Okeechobee, Fla., area						
	U.S. workers				Foreign workers		
	Total U.S.	Local	Intrastate	Interstate	Total foreign	British West Indies	Canadian and others
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
1963:							
August 1-15...	5,117	5,017	100	0	925	879	46
September 1-15:	9,758	8,778	400	580	1,208	1,157	51
October 1-15...	10,654	8,011	532	2,111	1,945	1,893	52
November 1-15:	14,898	10,813	1,415	2,670	8,005	7,605	400
December 1-15:	17,054	12,339	1,105	3,610	9,385	9,021	364
1964:							
January 1-15...	19,267	13,642	1,060	4,565	9,546	9,546	0
February 1-15:	23,295	15,485	2,490	5,320	8,716	8,716	0
March 1-15....:	25,141	16,716	2,705	5,720	8,939	8,939	0
April 1-15....:	18,181	14,436	1,600	2,145	6,574	6,574	0
May 1-15.....:	14,882	12,592	1,170	1,120	3,953	3,953	0
June 1-15.....:	6,005	,622	200	183	1,766	1,766	0
July 1-15.....:	4,449	4,449	0	0	715	715	0

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 28.--Estimated employment and origin of seasonal hired agricultural workers in Lake Okeechobee, Fla., reporting area, by selected periods, 1966-68 seasons

Period	Lake Okeechobee, Fla., area				
	U.S. workers				Total foreign
	Total U.S.	Local	Intrastate	Interstate	British West Indies <sup>1/</sup>
	Number	Number	Number	Number	Number
1966:					
August 1-15...	3,445	3,445	0	0	0
September 1-15:	6,084	5,734	100	250	480
October 1-15..:	10,243	8,018	400	1,825	587
November 1-15.:	12,733	9,733	600	2,400	7,082
December 1-15.:	15,072	12,023	550	2,499	8,705
1967:					
January 1-15...	17,075	12,427	1,600	3,048	8,674
February 1-15.:	18,407	14,082	1,101	3,224	7,665
March 1-15.....	17,650	13,630	1,050	2,970	5,310
April 1-15.....	15,009	13,159	600	1,250	943
May 1-15.....:	12,359	11,684	275	400	723
June 1-15.....:	4,882	4,882	0	0	0
July 1-15.....:	2,825	2,825	0	0	0
August 1-15....:	3,270	3,270	0	0	348
September 1-15:	5,603	5,503	0	100	441
October 1-15...:	8,645	7,445	100	1,100	646
November 1-15.:	11,928	9,078	350	2,500	6,594
December 1-15.:	15,562	12,232	500	2,830	8,972
1968:					
January 1-15...	15,775	11,575	1,100	3,100	8,715
February 1-15.:	16,155	11,755	1,100	3,300	0
March 1-15.....	14,770	10,270	1,100	3,400	0
April 1-15.....	14,490	10,490	1,200	2,800	0
May 1-15.....:	11,105	9,805	400	900	0

<sup>1/</sup> Used for harvesting citrus fruits and cultivating sugarcane.

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 29.--Estimated employment and origin of seasonal hired agricultural workers in Lower West Coast reporting area, Florida, by selected periods, 1963/64 season

Period	Lower West Coast area			
	U.S. workers			
	Total U.S.	Local	Intrastate	Interstate
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
1963:				
August 1-15.....	1,075	700	50	325
September 1-15.....	1,600	1,350	100	150
October 1-15.....	2,200	1,800	100	300
November 1-15.....	3,730	3,200	330	200
December 1-15.....	2,470	2,000	370	100
1964:				
January 1-15.....	3,000	2,400	300	300
February 1-15.....	3,150	2,700	250	200
March 1-15.....	3,550	3,000	250	300
April 1-15.....	5,500	3,500	1,500	500
May 1-15.....	3,500	2,000	800	700
June 1-15.....	1,000	800	150	50
July 1-15.....	600	550	25	25

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 30.--Estimated employment and origin of seasonal hired agricultural workers in Lower West Coast reporting area, Florida, by selected periods, 1966-68 seasons

Period	Lower West Coast area			
	U.S. workers			
	Total U.S.	Local	Intrastate	Interstate
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
1966:				
August 1-15.....	1,792	1,500	225	67
September 1-15.....	2,772	2,325	325	122
October 1-15.....	4,127	3,200	402	525
November 1-15.....	8,113	4,450	2,088	1,575
December 1-15.....	8,430	4,425	1,450	2,555
1967:				
January 1-15.....	8,086	4,400	1,600	2,086
February 1-15.....	9,751	5,281	2,470	2,000
March 1-15.....	8,150	4,350	1,800	2,000
April 1-15.....	9,700	4,600	2,800	2,300
May 1-15.....	12,950	5,100	3,250	4,600
June 1-15.....	2,602	1,700	575	327
July 1-15.....	1,389	1,208	141	40
August 1-15.....	2,170	1,865	200	105
September 1-15.....	3,385	2,435	350	600
October 1-15.....	5,895	3,815	1,100	980
November 1-15.....	8,412	4,439	1,523	2,450
December 1-15.....	9,500	4,800	1,915	2,785
1968:				
January 1-15.....	8,825	4,600	1,625	2,600
February 1-15.....	10,035	4,900	2,585	2,550
March 1-15.....	10,817	5,700	2,517	2,600
April 1-15.....	11,305	5,950	2,205	3,150
May 1-15.....	15,306	6,750	4,950	3,600

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports for the 15th of each month.

Table 31.--Number of seasonal hired farmworkers, by activity and crop, Florida, October 1967-June 1968

Activity of worker	1967			1968					
	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
	-----Number-----								
All activities.....	33,614	52,987	69,331	74,847	76,278	71,905	65,715	66,756	48,525
General.....	0	0	0	0	900	200	3,670	0	0
Cultivating.....	17,917	13,814	9,588	9,570	10,907	16,565	14,765	12,671	10,096
Vegetables.....	6,390	3,650	500	1,125	2,100	4,150	900	950	620
Fruits.....	7,841	8,311	8,638	7,220	7,352	8,790	9,315	10,434	8,240
Other crops.....	3,686	1,853	450	1,225	1,455	3,625	4,550	1,287	1,236
Harvesting.....	15,697	38,593	59,743	65,047	64,216	54,985	47,150	54,085	38,429
Vegetables.....	9,500	19,125	27,795	26,260	27,750	25,460	27,610	26,268	7,646
Tomatoes.....	0	5,000	10,250	10,050	10,650	11,100	8,550	7,350	1,300
Celery.....	0	1,150	2,295	2,295	2,730	2,740	2,785	2,333	901
Beans.....	500	3,600	3,850	3,070	3,320	3,670	3,900	2,210	20
Other vegetables.....	9,000	9,375	11,400	10,845	11,050	7,950	12,375	14,375	5,425
Fruits.....	5,142	10,374	17,119	23,952	22,784	15,884	14,215	18,942	15,938
Citrus.....	4,692	9,874	16,319	22,477	21,809	14,609	11,840	15,812	13,638
Strawberries.....	0	0	300	975	575	850	1,500	10	0
Other fruit.....	450	500	500	500	400	425	875	3,120	2,300
Tobacco.....	0	0	0	0	1,300	0	0	5,000	13,300
Other crops.....	1,055	9,094	14,829	14,835	12,382	13,641	5,325	3,875	1,545
Activity unspecified.....	0	580	55	230	255	155	130	0	0

Source: U.S. Department of Labor, Bureau of Employment Security, In-Season Farm Labor Reports (ES-223).

Table 32.--Wages for harvesting, Lower West Coast area, Florida, by crops, selected periods, 1966-68

Period	Unit	Tomatoes	Strawberries	Vegetables
<u>Dollars per unit</u>				
1966:				
January-				
March.....	Hour	0.80- 1.50	---	---
April.....	do.	.80- 1.50	---	---
May.....	Day	11.00-12.00	---	---
June.....	Hour	1.25	---	---
November....	do.	1.00	---	---
December....	do.	1.00- 1.25	---	---
1967:				
January.....	do.	1.00	---	---
February.....	do.	1.00- 1.25	---	---
March.....	do.	1.00- 1.25	---	---
April.....	do.	1.00	---	---
May.....	do.	1.00- 1.25	---	---
	:Bu. bkt.:			
	: (5/8)	.15- .20	---	---
June.....	do.	.15- .20	---	---
July.....	Hour	---	---	1.00-1.25
August.....	do.	---	---	1.00-1.25
September....	do.	1.00- 1.25	---	---
October.....	do.	1.00- 1.15	---	---
November.....	do.	1.00	---	---
1968:				
January.....	do.	1.15	1.00-1.25	1.15
February.....	do.	1.15	1.15-1.50	---
April.....	do.	1.15	---	1.15
May.....	:Bu. bkt.:			
	: (5/8)	.15- .20	---	---
	: Hour	---	---	1.25

Source: U.S. Department of Labor, Bureau of Employment Security, Farm Labor Development, Employment and Wage Supplement (various issues).

Table 33.--Wages for harvesting, Dade, Fla., area, by crops, selected periods, 1961-68 <sup>1/</sup>

Period	Unit	Tomatoes	Strawberries	Vegetables
<hr/>				
		<hr/> <u>Dollars</u> <hr/>		
January 1961.....	Bu. bkt. (5/8)	.10	---	---
May 1962.....	do.	.10	---	---
1963:				
February-March..	do.	<u>2/</u> .10	---	---
December.....	Hour	.70	---	---
	Bu. bkt. (5/8)	.10	---	---
	do.	<u>2/</u> .12	---	---
1964:				
February.....	do.	.10	---	---
December.....	do.	<u>3/</u> .14	---	---
February 1965.....	do.	<u>3/</u> .14	---	---
December 1966.....	do.	.15	---	---
1967:				
February.....	do.	.15	---	---
March.....	do.	.15	---	---
April.....	do.	.16	---	---
July.....	Hour	---	---	1.00
August.....	do.	---	---	1.00
October.....	do.	---	---	1.00
November.....	Bu. bkt. (5/8)	.15	---	---
	Hour	---	---	1.00
1968:				
January.....	Bu. bkt. (5/8)	.15	---	---
	Flat (12 pint)	---	.60	---
	Hour	---	---	1.00
February.....	Bu. bkt. (5/8)	.15	---	---
	Flat (12 pint)	---	.60	---
	Hour	---	---	1.00
April.....	Bu. bkt. (5/8)	.17	---	---
	Flat (12 pint)	---	.75	---

<sup>1/</sup> Usually preharvest and harvest rates.

<sup>2/</sup> Picking.

<sup>3/</sup> Picking and lugging.

Source: U.S. Department of Labor, Bureau of Employment Security, Farm Labor Developments, Employment and Wage Supplement (various issues).

Table 34.--Wages for harvesting tomatoes and vegetables, Lake Okeechobee, Fla., area, selected periods, 1961-68 1/

Period	Unit	Tomatoes		Vegetables
		Vine-ripe (Pompano)	Mature-green	
-----Dollars-----				
1961:				
January.....	Bu. bkt. (5/8):	---	0.10	---
March.....	Hour	0.65	---	---
	Day	6.00	---	---
1962:				
February-March..	Hour	.65	---	---
May.....	do.	.65	---	---
	Bu. bkt. (5/8):	---	.10	---
1963:				
February-March..	Hour	.65	---	---
December.....	do.	.70	---	---
	Day (9 hrs.)	---	7.00	---
	Bu. bkt. (5/8):	---	.10	---
1964:				
April.....	Hour	.70	1.00	---
	Bu. bkt. (5/8):	---	.10	---
December.....	Hour	.80	---	---
February 1965.....	do.	.80- .85	---	---
1966:				
January-March...	do.	.90-1.00	---	---
	Bucket	.15	---	---
April-May.....	Hour	.80-1.00	---	---
June.....	do.	1.00	---	---
November.....	do.	.85-1.00	---	---
December.....	do.	.85-1.00	---	---
1967:				
February.....	do.	1.00	---	---
March.....	do.	1.00	---	---
April.....	do.	1.00	---	---
May.....	do.	1.00	---	---
June.....	do.	1.00	---	---
September.....	do.	1.00	---	---
October.....	do.	---	---	1.00-1.15
November.....	do.	1.00	---	---
1968:				
January.....	do.	1.00	---	---
February.....	do.	1.15	---	1.15
April.....	do.	1.15	---	1.15
May.....	do.	---	---	1.15

1/ Usually preharvest and harvest rates.

Source: U.S. Department of Labor, Bureau of Employment Security, Farm Labor Developments, Employment and Wage Supplement (various issues).

Table 35.--Gross weekly earnings and hours employed, production workers on manufacturing payrolls, Miami area and the State of Florida, quarterly, January 1965-July 1968

Year and quarter	Florida			Miami		
	Weekly	Hours	Hourly	Weekly	Hours	Hourly
	earnings		earnings	earnings		earnings
	<u>Dollars</u>	<u>Number</u>	<u>Dollars</u>	<u>Dollars</u>	<u>Number</u>	<u>Dollars</u>
1965:						
January.....	90.74	42.6	2.13	84.66	40.9	2.07
April.....	92.02	42.6	2.16	85.27	40.8	2.09
July.....	90.69	41.6	2.18	85.27	40.8	2.09
October.....	93.29	42.6	2.19	86.07	40.6	2.12
1966:						
January.....	94.57	42.6	2.22	86.67	40.5	2.14
April.....	94.08	42.0	2.24	86.07	40.6	2.12
July.....	96.22	42.2	2.28	87.94	40.9	2.15
October.....	97.33	42.5	2.29	92.43	42.4	2.18
1967:						
January.....	98.18	42.5	2.31	90.45	41.3	2.19
April.....	99.41	42.3	2.35	91.96	41.8	2.20
July.....	101.04	42.1	2.40	93.88	42.1	2.23
October.....	102.00	42.5	2.40	90.98	40.8	2.23
1968:						
January.....	102.72	42.1	2.44	93.52	41.2	2.27
April.....	101.05	40.1	2.52	89.55	38.6	2.32
July.....	106.30	41.2	2.58	97.77	40.4	2.42

Sources: U.S. Department of Labor, Bureau of Labor Statistics, Employment and Earnings and Monthly Report of the Labor Force, Table C-9, selected issues.

Table 36.--Tomatoes, mature-green (ground): Preharvest cost per acre, Florida, 1967/68 season

(Yield: 350 40-pound lugs)							
Item	: Annual : : hours :	Labor : 1/ :	Equipment : :	Material	: Cost of : : materials :	: Combined : : costs :	: Total : : cost :
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Plant bed.....	2.00	2.40	4.00	Seed, 1 lb. @ \$10.38 1b.	10.38	16.78	
Rock plow.....	.75	1.12	5.78			6.90	
Disk (8 times).....	1.20	1.80	6.84			8.64	
Mark rows and fertilize.....	.40	.60	1.02	4-8-8, 2,800 lbs. @ \$0.0260 1b.	72.80	74.42	
Set transplants.....	1.20	7.56	4.68			12.24	
Apply weedkillers.....	.15	.22	.27			.49	
Irrigate.....	2.40	3.60	10.80			14.40	
Cultivate and fertilize (4 times).....	1.70	2.55	4.34	8-16-16, 700 lbs. @ \$0.0390 1b.	27.30	50.39	
				13-0-44, 300 lbs. @ \$0.0540 1b.	16.20		
Spray (30 times).....	3.00	4.50	5.40	Insecticides, fungicides, and nutritional materials	142.86	152.76	
Spray (aerial).....	Custom	---	---		9.83	9.83	
Other labor expenses	---	2.44	---			2.44	
Total growing cost.....		26.79	43.13		279.37		349.29
Cash overhead:							
Rent, land.....						38.10	
Interest on production capital (6 pct., 5 mo.).....						8.73	
Other (telephone, insurance, accounting)...						17.46	64.29
Total cash cost.....							413.58
Noncash overhead:							
Equipment investment (\$193.64):							
Depreciation.....						19.40	
Interest (6 pct.).....						5.81	25.21
Total all costs.....							438.79
Total cost per lug.....							1.25

1/ Labor: machine operations, \$1.50 per hour; hand operations, \$1.20 per hour.

Table 37.--Tomatoes, mature-green (ground): Preharvest cost per acre, Texas, 1967/68 season

(Yield: 250 40-pound lugs)							
Item	Annual hours	Labor 1/	Equipment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Plow.....	0.70	0.84	1.82			2.66	
Disk (2 times).....	.80	.96	2.32			3.28	
Float (2 times).....	.94	1.13	4.32			5.45	
Broadcast fertilizer.....	.28	.34	.29	8-24-0, 400 lbs. @\$70.00 ton	14.00	14.63	
Bed.....	.38	.46	.95			1.41	
Apply and incorporate herbicide:	.45	.54	6.70	Treflan or Enide	8.50	9.74	
Plant.....	2/.57	1.37	.88	Seed, 1 lb. @\$12.50 lb.	12.50	14.75	
Make ditches (4 times).....	.60	.72	1.74			2.46	
Irrigate (4 times).....	4.00	4.60	4.40	Water, \$200 per application	8.00	17.00	
Cultivate (4 times).....	2.20	2.64	4.84			7.48	
Sidedress (1 time).....	.60	.72	1.32	Liquid nitrogen (82%), 60 lbs. @\$0.16 lb.	9.60	11.64	
Spray (5 times).....				Custom aerial spray with \$5.00 applica- tion charge	17.30	17.30	
Thin and weed (1 time).....	12.66	14.56	---			14.56	
Weed and hoe (1 time).....	3.13	3.60	---			3.60	
Knock down ditches.....	.17	.20	1.87			2.07	
Other labor expenses.....	---	3.27	---			3.27	
Total growing cost.....		35.95	25.45		69.90	131.30	131.30
Cash overhead:							
Rent, land.....						30.00	
Interest on production capital : (6 percent, 4 months).....						2.63	
Miscellaneous.....						6.57	39.20
Total cash cost.....							170.50
Noncash overhead:							
Equipment investment (\$288.84):							
Depreciation.....						28.88	
Interest (6 percent).....						8.66	37.54
Total all costs.....							208.04
Total cost per lug.....							.83

1/ Labor: machine operations, \$1.20 per hour; hand operations, \$1.15 per hour.

2/ Two people are used in planting; therefore, labor hours are 1.14.

Table 38.--Tomatoes, vine-ripe (staked): Preharvest cost per acre, Florida, 1967/68 season

(Yield: 1,800 20-pound lugs)							
Item	Annual hours	Labor 1/	Equipment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Clear land.....	Custom	---	---	Bulldozers and dragline \$200 per acre, 3 years	66.67	66.67	
Lime.....	Custom	---	---	Lime, 1 ton per acre applied @\$12.00	12.00	12.00	
Disk (5 times).....	3.00	4.20	7.20			11.40	
Level.....	1.50	2.10	4.12			6.22	
Bed, fertilize, and plant.....	2.50	3.50	10.00	Seed, 1.2 lbs. @\$10.88 lb. 4-8-8, 2,500 lbs. @\$0.0280 lb.	13.06 70.00	96.56	
Fertilize and cultivate (20 times).....	9.60	26.88	24.48	3-10-12, 6,000 lbs. @\$0.0325 lb. 20-0-20, 300 lbs. @\$0.350 lb. Dragline operator @\$13.00 hr.	195.00 10.50 10.00	256.86	
Ditch.....	Custom	---	---			10.00	10.00
Cross ditch (20 times).....	6.00	8.40	10.80			19.20	
Clean ditches (20 times).....	10.00	12.00	---			12.00	
Set stakes.....	25.00	30.00	---	Stakes, 800 @\$0.06, 3 years	160.00	190.00	
Drive stakes.....	22.50	27.00	---			27.00	
Wire stakes.....	20.00	24.00	---	Wire, #18, 40-lbs. @\$0.09, 3 years	1.20	25.20	
Thin and weed (2 times).....	90.00	108.00	---			108.00	
Prune (5 times).....	120.00	144.00	---			144.00	
Tie plants (4 times).....	64.00	76.80	---		31.28	108.08	
Spray (40 times).....	12.00	16.80	21.60	Insecticides and fungicides	126.27	164.67	
Irrigate.....	15.00	18.00	4.70	Water charge @\$2.00 acre	2.00	24.70	
Remove stakes and clear field..	26.00	31.20	---			31.20	
Other labor expenses.....	---	53.29	---			53.29	
Total growing cost.....		586.17	82.90		697.98		1,367.05
Cash overhead:							
Rent, land.....						27.60	
Interest on production capital: (6 percent, 5 months).....						34.18	
Other (telephone, insurance accounting).....						68.35	130.13
Total cash cost.....							1,497.18
Noncash overhead:							
Equipment investment (\$157.10): Depreciation.....						15.74	
Interest (6 percent).....						4.71	20.45
Total all costs.....							1,517.63
Total cost per lug.....							.84

1/ Labor: Machine operations, \$1.40 per hour; hand operations, \$1.20 per hour.

Table 39.--Tomatoes, vine-ripe (staked): Preharvest cost per acre, California, 1967/68 season 1/

(Yield: 2,000 20-pound lugs)							
Item	Annual hours	Labor <u>2/</u>	Equipment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Land preparation.....	5	7.50	6.00	Custom ripping	7.00	20.50	
Survey and mark field.....	14	21.00	---			21.00	
Set and water plants.....	<u>3/40</u>	60.00	2.40	Plants, 4,300 @\$20.00 thousand	86.00	148.40	
Bait.....	5	7.50	---	Bait	2.00	9.50	
Hot cap.....	Custom	43.00	---	Super hot caps, 4,300 @\$42.50 thousand	182.75	225.75	
Heat.....	<u>4/30</u>	45.00	10.80	Heating oil, 400 gal. @\$0.15 gallon			
				Wind machine gas, \$7.20	67.20	123.00	
Stake <u>5/</u> .....	50	75.00	6.00	Stakes (cost \$161.00), reused	24.06	105.06	
Hoe and weed <u>6/</u> .....	70	105.00	---			105.00	
Cultivate (8 times); fertilize (2 times).....	18	27.00	11.70	Manure and commercial fertilizer	100.00	138.70	
Tie.....	80	120.00	---	String, 60 lb. @\$0.77 lb.	46.20	166.20	
Irrigate.....	25	37.50	---	Water, 4 acre ft.	22.00	59.50	
Dust.....	5	7.50	---	Insecticide and fungicides <u>7/</u>	17.00	24.50	
Miscellaneous <u>8/</u> .....	8	12.00	---	Miscellaneous materials	16.50	28.50	
Total growing cost.....		568.00	36.90		570.71		1,175.61
Cash overhead:							
Operating capital, utilities, etc.....						60.00	
Taxes: land, equipment.....						23.00	83.00
Total cash cost.....							1,258.61
Noncash overhead:							
Equipment investment (\$1,024.00):							
Depreciation.....						79.40	
Interest (6 percent).....						99.10	178.50
Total all costs.....							1,437.11
Total cost per lug.....							.72

1/ Based on sample cost information prepared by California Agricultural Extension Service2/ Labor: \$1.50 per hour.3/ Includes 2 tractor hours.4/ Includes 9 tractor hours.5/ Includes removal of stakes and storage with 5 hours of tractor use.6/ Includes opening and removal of hot caps.7/ Includes custom charge for two aerial applications.8/ Includes nontractor repairs.

Table 40.--Tomatoes, vine-ripe (staked): Preharvest cost per acre, Sinaloa, Mexico, 1967/68 season

(Yield: 1,800 20-pound equivalents marketed) 1/									
Item	Annual hours	Labor 2/	Equipment	Material	Cost of materials	Combined costs	Total cost		
		Dollars	Dollars		Dollars	Dollars	Dollars		
Operation:									
Plow.....	1.07	0.43	5.24				5.67		
Disk (5 times).....	.53	.21	3.37				3.58		
Subsoil (2 times).....	.84	.34	4.62				4.96		
Level (2 times).....	1.25	.50	7.44				7.94		
Measure plots.....	.10	.07	.20				.27		
Make furrows and fertilize.....	.62	.25	1.98	17-17-17, 410 lbs. @ \$0.44 lb.	18.04	20.27			
Make ditches and roads.....	.35	.14	1.66			1.80			
Direct seed and fertilize (on 1/3 of acreage).....	.70	.28	3.50	Seed, 1.01 lbs. @ \$10.20 lb.	10.30	14.08			
Hoe and weed.....	23.79	6.19	---			6.19			
Set check dams.....	.10	.04	.20			.24			
Irrigate (10 times).....	20.89	7.10	---	Water	3.95	11.05			
Fertilize by hand (4 times).....	4.93	1.28	---	18-46-0, 600 lbs. @ \$0.072 lb.	43.20	44.48			
Haul fertilizer (4 times).....	1.13	.34	1.13	35-0-0, 250 lbs. @ \$0.054 lb.	13.50	14.97			
Pull plants (2/3 of acreage).....	10.00	2.60	---			2.60			
Haul plants (2/3 of acreage).....	1.16	.35	1.16			1.51			
Set transplants (2/3 of acreage).....	9.20	2.39	---			2.39			
Weed (3 times).....	27.00	7.02	---			7.02			
Cultivate (6 times).....	4.00	1.60	14.00			15.60			
Cultivate with mule (2 times).....	12.20	3.17	3.17			6.34			
Dust by hand (6 times).....	7.04	1.83	---	Insecticides, fungicides, and foliar material	97.17	99.00			
Spray and dust, aerial (16 times).....	Custom	---	---	360 lbs. @ \$0.03 lb.	10.80	10.80			
Hauling poles and stakes.....	3.38	1.01	3.38			4.39			
Setting poles.....	22.93	5.96	---	Poles, 972 @ \$0.05 every 4 years	12.15	18.11			
Setting stakes.....	21.16	5.50	---	Stakes, 4,650 @ \$0.013 every 3 years	20.15	25.65			
String wire.....	6.72	1.75	---	Wire, 106 lbs. @ \$0.13 every 3 years	4.59	6.34			
Tying vines (8 times).....	65.81	17.11	---	Twine	20.40	37.51			
Prune (7 times).....	73.05	18.99	---			18.99			
Open and close ditches (6 times).....	1.94	.78	5.82			6.60			
Scare birds.....	12.14	3.16	---			3.16			
Remove wire, stakes, and poles.....	50.32	13.08	---			13.08			
Haul from field.....	6.73	2.02	6.73			8.75			
Other labor expenses, including soil tests and entomologists..	---	10.55	---		7.77	18.32			
Total growing cost.....		116.04	63.60		262.02		441.66		
Cash overhead:									
Rent, land.....						25.91			
Interest on production capital (9 percent, 6 months).....						19.88			
Miscellaneous.....						22.08	67.87		
Total cash cost.....							509.53		
Noncash overhead:									
Equipment investment (\$279.29):									
Depreciation.....						28.92			
Interest (9 percent).....						12.57	41.49		
Total all costs.....							551.02		
Total cost per marketed box.....							.31		

1/ Yields: 1,100 - 20-lb. equivalents exported  
700 - 20-lb. equivalents for domestic use  
1,800 - 20-lb. equivalents marketed

2/ Labor: Machine operations, \$0.40 per hour  
truck drivers 0.30 per hour  
irrigators 0.34 per hour  
field hands 0.26 per hour

Table 41.--Bell peppers: Preharvest cost per acre, Florida, 1967/68 season

(Yield: 645 crates)

Item	Annual hours	Labor 1/	Equipment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Lime.....	Custom	---	---	1 ton per acre, custom applied @ \$15.00	15.00	15.00	
Disk (4 times).....	1.56	1.95	3.43			5.38	
Bed and fertilize.....	.56	.70	1.00	5-6-6, 2,000 lbs. @ \$0.0265 lb.	53.00	54.70	
Seed.....	1.50	1.88	2.55	Seed, 3 lbs. @ \$9.83 lb.	29.49	33.92	
Scrape beds.....	2.00	2.50	3.00			5.50	
Spray weedkiller.....	.30	.38	.54	Weedkiller	12.00	12.92	
Fertilize (7 times).....	2.45	3.06	6.25	8-8-8, 3,500 lbs. @ \$0.0300 lb.	105.00	114.31	
Cultivate (4 times).....	1.20	1.50	2.28			3.78	
Thin and weed.....	91.00	104.65	---			104.65	
Cultivate and fertilize (10 times).....	3.50	4.38	8.92			13.30	
Spraying (20 times).....	2.40	3.00	4.32	Insecticides and fungicides	71.10	78.42	
Ditching.....	Custom	---	---	Dragline and operator @ \$13.00 hr.	15.00	15.00	
Cross ditch (15 times).....	4.00	5.00	7.20			12.20	
Clean ditches (15 times).....	13.20	15.18	---			15.18	
Irrigate.....	18.00	20.70	5.00	Water charges @ \$1.50 acre	1.50	27.20	
Other labor expenses.....	---	16.49	---			16.49	
Total growing cost.....		181.37	44.49		302.09		527.95
Cash overhead:							
Rent, land.....						35.00	
Interest on production capital: (6 percent, 5 months).....						13.20	
Other (telephone, insurance, accounting).....						26.40	74.60
Total cash cost.....							602.55
Noncash overhead:							
Equipment investment (\$100): Depreciation.....						10.07	
Interest (6 percent).....						3.00	13.07
Total all costs.....							615.62
Total cost per crate.....							.95

1/ Labor: machine operators, \$1.25 per hour; hand labor, \$1.15 per hour.

Table 42.--Bell peppers: Preharvest cost per acre, Texas, 1967/68 season

(Yield: 500 bushels)							
Item	Annual hours	Labor 1/	Equipment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Subsoil (1/2 time).....	0.38	0.48	0.93			1.41	
Plow.....	.91	1.14	2.37			3.51	
Disk (2 times).....	.75	.94	2.59			3.53	
Float (2 times).....	.81	1.01	2.92			3.93	
Broadcast fertilizer.....	.18	.23	.34	12-24-42, 500 lbs. @ \$87.50 ton	21.88	22.45	
Bed.....	.30	.38	.75			1.13	
Apply herbicide.....	---	---	---	Treflan, includes \$1.00 application cost	9.00	9.00	
Incorporate herbicide.....	.71	.89	1.70			2.59	
Plant and replant.....	2/.42	1.05	.78	Seed, 3 lbs. @ \$10.00 lb.	30.00	31.83	
Make ditches (9 times).....	.79	.99	2.29			3.28	
Irrigate (9 times).....	2/9.00	22.50	9.90	Water, \$2.00 per application	18.00	50.40	
Knock down ditches (9 times)..	1.90	2.38	3.90			6.28	
Thin, hoe, and weed.....	34.00	39.10	---			39.10	
Cultivate and sidedress (4 times).....	2.00	2.50	4.80	Liquid nitrogen (82%), 150 lbs. @ \$0.16 lb.	24.00	31.30	
Spray (10 times).....	2.00	2.50	4.30	Sevin, Manzate, Cygon	20.00	26.80	
Other labor expenses.....	---	7.61	---			7.61	
Total growing cost.....		83.70	37.57		122.88		244.15
Cash overhead:							
Rent, land.....						30.00	
Interest on production capital: (6 percent).....						4.88	
Miscellaneous.....						12.21	47.09
Total cash cost.....							291.24
Noncash overhead:							
Equipment investment (\$455.67): Depreciation.....						45.57	
Interest (6 percent).....						13.67	59.24
Total all costs.....							350.48
Total cost per bushel.....							.70

1/ Labor: machine operations, \$1.25 per hour; hand operations, \$1.15 per hour.

2/ Two people.

Table 43.--Bell peppers: Preharvest cost per acre, Sinaloa, Mexico, 1967/68 season

Item	Annual hours	(Yield: 360 bushels marketed)			Material	Cost of materials	Combined costs	Total cost
		Labor 1/	Equip- ment					
		Dollars	Dollars			Dollars	Dollars	Dollars
Operation:								
Disk (4 times).....	1.08	0.43	6.91				7.34	
Plow.....	.93	.37	4.56				4.93	
Subsoil (2 times).....	1.36	.54	7.48				8.02	
Level (2 times).....	1.60	.64	9.52				10.16	
Furrow.....	.50	.20	1.55				1.75	
Set check dams.....	.12	.11	.12				.23	
Ditch.....	.15	.06	.71				.77	
Plant bed operations.....	3.25	6.37	14.62				40.99	
Irrigate (10 times).....	20.85	7.09	---	Water	5.15		12.24	
Pull plants.....	6.19	1.61	---	Seed, 0.67 lb. @ \$9.90 lb.	6.63		8.24	
Load and haul plants.....	.68	.73	.68				1.41	
Set transplants.....	20.81	5.41	---				5.41	
Haul fertilizer.....	.33	.27	.33				.60	
Fertilize (2 times).....	4.86	1.26	---	15-15-20, 200 lbs. @ \$0.062 lb.	12.40			
				18-46-0, 200 lbs. @ \$0.058 lb.	11.60		26.98	
				35-0-0, 40 lbs. @ \$0.043 lb.	1.72			
Dust by hand (16 times).....	26.26	6.83	---	Insecticides, fungicides, and nutritional materials	117.80		124.63	
Dust or spray, aerial, (12 times).....	Custom	---	---	Plane and application	4.37		4.37	
Hoe and weed (2 times).....	26.36	6.85	---				6.85	
Weed (6 times).....	218.62	56.84	---				56.84	
Cultivate (4 times).....	3.01	1.20	10.54				11.74	
Haul stakes.....	.91	.74	.91				1.65	
Set stakes.....	38.87	10.11	---	States, 2,430 @ \$0.013 every 3 years	10.53		20.64	
String (3 times).....	19.43	5.05	---	Twine, 151 lbs. @ \$0.23	34.73		39.78	
Open and close ditches (4 times).....	.65	.26	1.95				2.21	
Repair roads.....	.25	.10	1.12				1.22	
Other labor expenses.....	---	11.31	---				11.31	
Total growing cost.....		124.38	61.00			204.93		390.31
Cash overhead:								
Rent, land.....							32.39	
Interest on production capital (9 pct., 6 mo.).....							17.56	
Miscellaneous.....							19.52	69.47
Total cash cost.....								459.78
Noncash overhead:								
Equipment investment (\$55.86):								
Depreciation.....							5.78	
Interest (9 pct.).....							2.51	8.29
Total all costs.....								468.07
Total cost per bushel.....								1.30

1/ Labor: Machine operators, \$0.40 per hour; truck drivers, \$0.30 per hour; irrigators, \$0.34 per hour; field hands, \$0.26 per hour.

Table 44.--Cucumbers: Preharvest cost per acre, Dade County, Florida, 1967/68 season

(Yield: 330 bushels)								
Item	: Annual : : hours :	Labor : : 1/ :	Equipment : :	Material	: Cost of : : materials :	Combined : : costs :	Total : : cost :	
		Dollars	Dollars		Dollars	Dollars	Dollars	
Operation:								
Disk (6 times).....	6.00	8.40	33.60			42.00		
Plow.....	.92	1.29	5.52			6.81		
Plant and fertilize.....	.80	1.12	1.68	Seed, 2 lbs. @ \$3.35 lb.	6.70	109.50		
				5-10-8, 2,500 lbs. @ \$0.040	100.00			
Cultivate and fertilize (2 times).....	1.50	2.10	3.82	13-0-44, 200 lbs. @ \$0.055	11.75	17.67		
				Nugreen, 15 lbs. @ \$0.050				
Thin and weed.....	22.30	25.64	---			25.64		
Spray (25 times).....	5.25	7.35	9.71	Insecticides and fungicides	43.50	60.56		
Irrigate (10 times).....	3.50	4.02	15.75			19.77		
Other labor expenses.....	---	4.99	---			4.99		
Total growing cost.....		54.91	70.08		161.95		286.94	
Cash overhead:								
Rent, land.....						33.27		
Interest on production capital (6 pct. 5 mo.).....						7.17		
Other (telephone, insurance, accounting)...						14.35	54.79	
Total cash cost.....							341.73	
Noncash overhead:								
Equipment investment (\$313.79):								
Depreciation.....						31.72		
Interest (6 pct.).....						9.41	41.13	
Total all costs.....							382.86	
Total cost per bushel.....							1.16	

1/ Labor: machine operations, \$1.40 per hour; hand operations, \$1.15 per hour.

Table 45.--Cucumbers: Preharvest cost per acre, Immokalee, Fla., 1967/68 season

(Yield: 390 bushels)							
Item	: Annual : hours	: Labor : 1/	: Equipment	: Material	: Cost of : materials	: Combined : costs	: Total : cost
		<u>Dollars</u>	<u>Dollars</u>		<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Operation:							
Disk (8 times).....	3.20	4.48	8.96			13.44	
Ditch and dike.....	Custom	---	---	Dragline, 1 hr. per acre @ \$13.00	13.00	13.00	
Lime.....	Custom	---	---	Lime, 1 ton per acre @ \$10.00	10.00	10.00	
Bed, fertilize, and plant.....	.85	1.19	1.91	4-8-8, 1,000 lbs. @ \$0.0275	27.50	35.62	
				Seed, 1.5 lbs. @ \$3.35	5.02		
Spray (9 times).....	1.80	2.52	3.33	Insecticides and fungicides	34.88	40.73	
Thin and weed.....	9.50	10.92	---			10.92	
Cultivate and fertilize (3 times).....	1.80	2.52	4.68	4-8-8, 2,000 lbs. @ \$0.0275	55.00	71.00	
				Nugreen, 200 lbs. @ \$0.044	8.80		
Irrigate (10 times).....	6.00	6.90	9.00	Water charge @ \$2.00 acre	2.00	17.90	
Cross ditch (10 times).....	6.50	9.10	12.35			21.45	
Clean ditches (10 times).....	10.00	11.50	---			11.50	
Other labor expenses.....	---	4.91	---			4.91	
Total growing cost.....		54.04	40.23		156.20		250.47
Cash overhead:							
Rent, land.....						15.00	
Interest on production capital (6 pct. 5 mo.).....						6.26	
Other (telephone, insurance, accounting)...						12.52	33.78
Total cash cost.....							284.25
Noncash overhead:							
Equipment investment (\$275.00):							
Depreciation.....						27.50	
Interest (6 pct.).....						8.25	35.75
Total all costs.....							320.00
Total cost per bushel.....							.82

1/ Labor: machine operations, \$1.40 per hour; hand operations, \$1.15 per hour.

Table 46.--Cucumbers: Preharvest cost per acre, Texas, 1967/68 season

(Yield: 175 bushels)							
Item	Annual : hours	Labor : 1/ : hours	Equipment : Dollars	Material	Cost of : materials	Combined : costs	Total : cost
			Dollars		Dollars	Dollars	Dollars
Operation:							
Subsoil (1/2 time).....	0.50	0.63	1.23			1.86	
Plow.....	.80	1.00	2.08			3.08	
Disk (2 times).....	.70	.88	2.03			2.91	
Float (2 times).....	.67	.84	2.18			3.02	
Bed.....	.33	.41	.83			1.24	
Fertilize.....	.33	.41	.63	12-24-12, 375 lbs. @ \$100.00 ton	19.75	19.79	
Apply herbicide.....	Custom	---	---	Treflan, 1 quart @ \$7.60 plus \$1.50 application fee	9.10	9.10	
Incorporate herbicide.....	1.00	1.25	2.40			3.65	
Plant (1 1/4 times).....	2/ .41	1.03	.98	Seed, 3 lbs. @ \$3.25 lb.	9.75	11.76	
Cultivate (3 times).....	1.53	1.92	3.67			5.59	
Pollination.....	---	---	---	Bees, rental @ \$5.00 hive	3.00	3.00	
Spray (4 times).....	1.21	1.51	2.78	Ethyl Parathion, Sevin, Karathane, Manzate, Morestan	18.00	22.29	
Make ditches.....	.52	.65	1.51			2.16	
Irrigate (4 times).....	2/ 4.00	10.00	4.40	Water @ \$2.00 per application	8.00	22.40	
Knock down ditches (4 times).....	.64	.80	1.85			2.65	
Fertilize (1 time).....	.50	.63	.95	82% nitrogen, 80 lbs. @ \$0.06 lb.	4.80	6.38	
Thin and weed (1 time).....	18.00	20.70	---			20.70	
Other labor expenses.....	---	4.27	---			4.27	
Total growing cost.....		46.93	27.52		71.40		145.85
Cash overhead:							
Rent, land .....						30.00	
Interest on production capital (6 pct.)...						2.92	
Miscellaneous.....						7.29	40.21
Total cash cost.....							186.06
Noncash overhead:							
Equipment investment (\$347.56):							
Depreciation.....						34.76	
Interest (6 pct.).....						9.87	44.63
Total all costs.....							230.69
Total cost per bushel.....							1.32

1/ Labor: Machine operations, \$1.25 per hour; hand operations, \$1.15 per hour.

2/ Two people, hence labor hours are double hours stated.

Table 47.--Cucumbers: Preharvest cost per acre, California, 1967/68 season 1/

(Yield: 350 bushels)								
Item	Annual hours	Labor 2/ Dollars	Equipment Dollars	Material	Cost of materials Dollars	Combined costs Dollars	Total cost Dollars	
Operation:								
Land preparation.....	5	7.50	6.00			13.50		
Survey and mark field.....	10	15.00	---			15.00		
Set and water plants.....	<u>3/</u> 32	48.00	2.40	Plants in containers, 3200	97.28	147.68		
Bait.....	4	6.00	---	@ \$30.40 thou.				
Hot cap.....	Custom	32.00	---	Bail	2.00	8.00		
Heat.....	<u>4/</u> 30	45.00	10.80	Super hot caps, 3200				
				@ \$42.50 thou.	136.00	168.00		
				Heater oil, 200 gal. @ \$0.15 gal.	33.60	89.40		
				Wind machine gas, \$3.60				
Weed and hoe <u>5/</u> .....	55	82.50	---			82.50		
Cultivate (3 times) and fertilize(2 times):	11	16.50	7.15	Fertilizer and manure	100.00	129.70		
Irrigate (15 times).....	10	15.00	---	Water	18.00	33.00		
Dust, hand (2 times), plane (1 time).....	4	6.00	---	Insecticides <u>6/</u>	14.50	20.50		
Other labor expenses <u>7/</u> .....	6	9.00	---	Miscellaneous materials	14.00	23.00		
Total growing cost.....		282.50	26.35		415.38		724.23	
Cash overhead:								
Operating capital, utilities, etc.....						37.50		
Taxes on land, equipment.....						23.00	60.50	
Total cash cost.....							784.73	
Noncash overhead:								
Equipment investment (\$868.00):								
Depreciation.....						63.80		
Interest (6 pct.).....						91.70	155.50	
Total all costs.....							940.23	
Total cost per bushel.....							2.69	

1/ Based on sample cost information prepared by California Agricultural Extension Service.2/ Labor: \$1.50 per hour.3/ Two tractor hours included.4/ Includes 9 tractor hours.5/ Includes opening and removing hot caps.6/ Includes custom charge for one aerial dusting.7/ Includes nontractor repairs.

Table 48.--Cucumbers: Preharvest cost per acre, Sinaloa, Mexico, 1967/68 season

(Yield: 235 crates)							
Item	Annual hours	Labor 1/ hours	Equipment Dollars	Material	Cost of materials Dollars	Combined costs Dollars	Total cost Dollars
Operation:							
Disk (4 times).....	2.27	0.91	13.39			14.30	
Plow (2 times).....	1.65	.66	8.12			8.78	
Subsoil.....	.91	.36	4.78			5.14	
Level (2 times).....	1.78	.71	10.59			11.30	
Cut ditches.....	.16	.06	.84			.90	
Make furrows.....	.59	.24	2.86			3.10	
Seed and fertilize.....	.96	.38	4.66	Seed 2.43 lbs. @ \$2.30 lb. 18-46-0, 225 lbs. @ \$0.072 lb.	5.59 16.20	26.83	
Replant.....	4.05	1.05	---			1.05	
Cultivate and fertilize (4 times).....	1.75	.70	9.45	17-17-17, 450 lbs. @ \$0.044 lb. 0-0-50, 195 lbs. @ \$0.044 lb.	19.80 8.58	38.53	
Set check dams.....	1.55	.40	---			.40	
Irrigate (4 times).....	12.16	4.26	---	Water	3.25	7.51	
Weed (4 times).....	68.59	17.83	---			17.83	
Fertilizer (3 times).....	5.82	1.51	---	35-0-0, 150 lbs. @ \$0.054 lb.	8.10	9.61	
Spray (5 times).....	.53	.49	2.65	Insecticides, fungicides, and nutritional materials	29.84	32.98	
Open and close ditches (4 times).....	.89	.36	4.14			4.50	
Haul fertilize (8 times).....	1.62	.49	1.62			2.11	
Build road.....	.24	.10	1.20			1.30	
Other labor expenses.....	---	3.05	---			3.05	
Total growing cost.....	---	33.56	64.30		91.36		189.22
Cash overhead:							
Rent, land.....						20.75	
Interest on production capital (9 pct., 6 mo.).....						8.52	
Miscellaneous.....						9.46	38.73
Total cash cost.....							227.95
Noncash overhead:							
Equipment investment (\$150.03):							
Depreciation.....						15.44	
Interest (9 pct.).....						6.74	22.18
Total all costs.....							250.13
Total cost per export crate.....							1.06

1/ Labor: Machine operators, \$0.40 per hour; truck drivers, \$0.30 per hour; irrigators, \$0.35 per hour; field hands, \$0.26 per hour.

Table 49.--Eggplant: Preharvest cost per acre, Florida, 1967/68 season

(Yield: 845 bushels)							
Item	: Annual : hours	: Labor : 1/ Dollars	: Equipment : Dollars	Material	: Cost of : : materials	: Combined : costs	: Total : cost
					Dollars	Dollars	Dollars
Operation:							
Flood.....	0.50	0.58	0.40			0.98	
Fumigate.....	.55	.69	.85	Cyanamid	22.78	24.32	
Lime.....	Custom	---	---	Lime, 1 ton per acre	15.00	19.14	
Disk (4 times).....	1.20	1.50	2.64				
Level.....	1.10	1.38	3.02			4.40	
Fertilize (5 times).....	4.00	5.00	10.20	4-6-8, 3,000 lbs. @ \$0.0325 lb.	97.50	149.20	
				15-0-15, 1,000 lbs. @ \$0.0365 lb.	36.50		
Bed.....	1.00	1.25	1.70			2.95	
Plant.....	1.50	1.88	2.55	Seed, 1.25 lbs. @ \$7.00 lb.	8.75	13.18	
Cultivate (12 times).....	3.60	4.50	6.84			11.34	
Cross ditch (12 times).....	3.20	4.00	5.76			9.76	
Clean ditches (12 times).....	1.20	1.38	---			1.38	
Thin.....	25.00	28.75	---			28.75	
Hoe and weed.....	3.90	4.49	---			4.49	
Weed (2 times).....	27.00	31.05	---			31.05	
Spray (24 times).....	5.50	6.88	9.90	Insecticides and fungicides	144.48	161.26	
Irrigate.....	16.00	18.40	5.00	Water charge, \$1.50 per acre	1.50	24.90	
Ditching.....	Custom	---	---	Dragline and operator, \$13.00 per hr.	20.00	20.00	
						11.17	
Other labor expenses.....	---	11.17	---				
Total growing cost.....		122.90	48.86		346.51		518.27
Cash overhead:							
Rent, land.....						45.00	
Interest on production capital (6 pct., 5 mo.).....						12.96	
Other (telephone, insurance, accounting).....						25.91	83.87
Total cash cost.....							602.14
Noncash overhead:							
Equipment investment (\$396.56):							
Depreciation.....						39.84	
Interest (6 pct.).....						11.90	51.74
Total all costs.....							653.88
Total cost per bushel.....							.77

1/ Labor: Machine operator, \$1.25 per hour; hand operator, \$1.15 per hour.

Table 50.--Eggplant: Preharvest cost per acre, Sinaloa, Mexico, 1967/68 season

(Yield: 1200 bushel crates marketed)							
Item	Annual hours	Labor 1/	Equip- ment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Seed bed operations, machine.....	0.21	0.07	1.05	Seed, 0.55 lbs. @ \$4.00 lb.	2.20	3.32	
Seed bed operations, hand.....	21.81	5.67	---			5.67	
Disk (5 times).....	1.62	.57	10.29			10.86	
Plow.....	.65	.23	3.18			3.41	
Level (2 times).....	1.00	.35	5.95			6.30	
Furrow.....	.50	.18	2.42			2.60	
Make ditches.....	.20	.07	1.05			1.12	
Set check dams.....	.15	.05	.15			.20	
Irrigate (23 times).....	19.00	6.46	---	Water	5.25	11.71	
Pull plants and load.....	2.16	.56	---			.56	
Haul plants.....	.54	.16	.54			.70	
Set transplants.....	8.48	2.20	---			2.20	
Haul fertilizer (9 times).....	2.83	.85	2.83			3.68	
Fertilize by hand (4 times).....	7.56	1.97	---	17-17-17, 450 lbs. @ \$0.043 lb.	19.35	36.69	
				18-46-0, 265 lbs. @ \$0.058 lb.	15.37	6.72	
Hoe and weed.....	25.83	6.72	---			13.27	
Weed (3 times).....	51.04	13.27	---			8.60	
Cultivate (4 times).....	2.15	.75	7.85			4.60	
Cultivate and fertilize (2 times).....	1.15	.40	4.20			10.35	
Fertilize and irrigation water (3 times).....	.12	.03	---	35-0-0, 240 lbs. @ \$0.043 lb.	10.32	10.35	
Load and haul stakes.....	3.24	1.97	3.24	Stakes, 200 lbs. @ \$0.04 every 3 years	26.67	31.88	
Set stakes and wire.....	45.88	11.93	---	Wire, 50 lbs. @ \$0.13 every 3 years	2.17	14.10	
Tie plants (4 times).....	25.91	6.74	---	Twine, 210 lbs. @ \$0.22 lb.	46.20	52.94	
Prune and trim (2 times).....	12.96	3.37	---			3.37	
Open and close ditches (5 times).....	.81	.28	4.25			4.53	
Spray (10 times).....	32.39	8.42	---	Insecticides, fungicides, and nutritional materials	38.87	47.29	
Repair road.....	.32	.11	1.68			1.79	
Other labor expenses, including soil tests and entomologist.....	---	7.33	---		7.50	14.83	
Total growing cost.....		80.71	48.68		173.90		303.29
Cash overhead:							
Rent, land.....						27.72	
Interest on production capital (9 pct., 6 mo.).....						13.65	
Miscellaneous.....						15.16	56.53
Total cash cost.....							359.82
Noncash overhead:							
Equipment investment (\$111.72):							
Depreciation.....						11.57	
Interest (9 pct.).....						5.03	16.60
Total all costs.....							376.42
Total cost per export bushel crate.....							.31

1/ Labor: Machine operators, \$0.35 per hour; truck drivers, \$0.30 per hour; irrigators, \$0.34 per hour; field hands, \$0.26 per hour.

Table 51.--Cantaloups: Preharvest cost per acre, Texas, 1967/68 season

(Yield: 150 crates)								
Item	: Annual : hours :	Labor : 1/ :	Equipment : :	Material	: Cost of : materials :	Combined : costs :	Total : cost	
		<u>Dollars</u>	<u>Dollars</u>		<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	
Operation:								
Subsoil (1/2 time).....	0.33	0.41	0.94			1.35		
Plow (1 time).....	.83	1.04	2.08			3.12		
Float (2 times).....	.86	1.08	3.49			4.57		
Broadcast fertilizer.....	.09	.11	.10	12-24-12, 300 lbs. @ \$87.50 ton	13.14	13.35		
Disk (2 times).....	.82	1.03	2.13			3.16		
Bed.....	.30	.38	.50			.88		
Cultivate, shape bed, incorporate herbi- cide.....	.32	.40	.74	Herbicide, Prefar or Treflan	8.00	9.14		
Make ditches (4 times).....	.52	.65	1.51			2.16		
Preirrigate.....	1.05	1.21	1.16	Water	1.67	4.04		
Plant.....	.38	.48	.59	Seed, 2 lbs. @ \$2.50 lb.	5.00	6.07		
Replant (1/4 time).....	.09	.11	.15	Seed, 1/2 lb. @ \$2.50 lb.	1.25	1.51		
Irrigate (4 times).....	4.28	4.92	4.71	Water	6.67	16.30		
Knock down ditches (4 times).....	.64	.80	1.31			2.11		
Cultivate (2 times).....	1.02	1.28	2.45			3.73		
Thin and weed.....	10.46	12.03	---			12.03		
Weed.....	6.60	7.59	---			7.59		
Sidedress.....	.49	.61	1.18	12-24-12, 275 lbs. or equivalent 32% Nitrogen	12.05	13.84		
Chisel bed.....	.57	.71	1.37			2.08		
Split bed.....	.33	.41	.83			1.24		
Spray (4 times).....	1.21	1.51	3.51	Parathion, Cygon, Manzate, Sevin	9.71	14.73		
Pollination.....	---	---	---	Bees, rental charge	1.82	1.82		
Train vines (1 time).....	9.2	10.58	---			10.58		
Turn cantaloups (1/5 time).....	1.8	2.07	---			2.07		
Miscellaneous labor.....	---	4.94	---			4.94		
Total growing cost.....		54.35	28.75		59.31		142.41	
Cash overhead:								
Rent, land.....						30.00		
Interest on production capital (6 pct. 4 mo.).....						2.85		
Miscellaneous.....						7.12	39.97	
Total cash cost.....							182.38	
Noncash overhead:								
Equipment investment (\$255.20):								
Depreciation.....						22.52		
Interest (6 pct.).....						6.76	29.28	
Total all costs.....							211.66	
Total cost per crate.....							1.41	

1/ Labor: machine operations, \$1.25 per hour; hand operations, \$1.15 per hour.

Table 52.--Cantaloups, spring: Preharvest cost per acre, Imperial Valley, California, 1967/68 season 1/

(Yield: 160 crates)						
Item	: Annual : : hours :	Labor : 2/ :	Material	: Cost of : : materials :	Combined : costs :	Total : cost
		Dollars		Dollars	Dollars	Dollars
Operation:						
Plow.....	Custom	---	Tractor and plow	8.00	8.00	
Disk (2 times).....	do.	---	Tractor and disk	4.00	4.00	
Border and break border.....	do.	---	Tractor and ditcher	1.00	1.00	
Flood.....	1	2.00	Water, \$0.75 acre ft.	1.73	3.73	
Fertilize.....	Custom	---	11-48-0, 400 lbs.; \$1.00 appli- cation charge	20.00	20.00	
Border disk.....	do.	---	Tractor and disk	5.00	5.00	
Fumigate.....	do.	---	Fumigant, \$14.00; \$3.00 appli- cation charge	17.00	17.00	
Plant and shape beds.....	do.	---	Seed, 2 lbs. @ \$2.25 lb.; \$3.00 planting charge	7.50	7.50	
Thin.....	10	20.00			20.00	
Turn vines (3 times).....	20	40.00			40.00	
Cultivate (3 times).....	Custom	---	Tractor and cultivator	9.00	9.00	
Fertilize, sidedress (2 times).....	do.	---	Nitrogen, 150 lbs. @ \$0.10; \$4.00 application charge	19.00	19.00	
Hoe (2 times).....	15	30.00			30.00	
Irrigate (6 times).....	3	6.00	Water, 3 acre ft.	6.90	12.90	
Pest control (6 times).....	Custom	---	Pesticides, \$18.00; \$15.00 appli- cation charge	33.00	33.00	
Pollination.....	---	---	Bees, 1.5 hives @ \$4.00	6.00	6.00	
Total growing cost and noncash overhead..		98.00		138.13		236.13
Cash overhead:						
Rent, land.....					65.00	
Interest on production capital (6 pct. 6 mo.).....					6.57	
Miscellaneous.....					10.00	81.57
Total all costs.....						317.70
Total cost per crate.....						1.99

1/ Based on sample production cost information prepared by the California Agriculture Extension Service.2/ Labor: hand operations, \$2.00 per hour; machine operations, custom charges.

Table 53.--Cantaloups: Preharvest cost per acre, Apatzingan, Mexico, 1967/68 season

(Yield: 125 crates marketed) 1/							
Item	: Annual : : hours :	Labor : 2/	Equipment :	Material	: Cost of : : materials :	Combined : costs	Total : cost
		<u>Dollars</u>	<u>Dollars</u>		<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Operation:							
Plow.....	0.93	0.28	2.88			3.16	
Subsoil.....	1.26	.38	3.97			4.35	
Disk (2 times).....	1.17	.35	4.09			4.44	
Level (2 times).....	1.01	.30	3.69			3.99	
Bed and fertilize.....	1.30	.39	3.90	15-30-15, 400 lbs. @ \$0.073 lb.	29.20	33.49	
Seed.....	12.96	2.33	---	Seed, 1.6 lbs. @ \$4.00 lb.	6.40	8.73	
Irrigate (9 times).....	46.36	9.27	18.00	Water	9.23	36.50	
Thin.....	7.50	1.35	---			1.35	
Fertilize.....	3.24	.58	---	15-15-15, 200 lbs. @ \$0.062 lb.	12.40	12.98	
Cultivate (6 times).....	6.90	2.07	19.32			21.39	
Hoe and weed (3 times).....	37.77	6.80	---			6.80	
Cultivate with mule (3 times).....	7.89	1.42	1.74			3.16	
Dust (14 times).....	13.60	2.45	7.00	Insecticides, fungicides, and nutritional materials	34.80	44.25	
Spray by plane (3 times).....	Custom	---	---		2.42	2.42	
Train vines (3 times).....	45.50	8.19	---			8.19	
Place and turn melons on rocks (3 times).....	105.60	19.01	---			19.01	
Other labor expenses.....	---	5.52	---	Beehive rental	3.25	8.77	
Total growing cost.....		60.69	64.59		97.70		222.98
Cash overhead:							
Rent, land.....						18.53	
Interest on production capital (9 pct. 5 mo.).....						8.36	
Other.....						11.15	38.04
Total cash cost.....							261.02
Noncash overhead:							
Equipment investment (\$377.33):							
Depreciation.....						39.64	
Interest (9 pct.).....						17.02	56.66
Total all costs.....							317.68
Total cost per marketed crate.....							2.54

1/ Yield: 67 export crates  
58 domestic crates  
125 crates marketed

2/ Labor: machine operators, \$0.30 per hour; irrigators, \$0.20 per hour; field hands, \$0.18 per hour.

Table 54.--Cantaloups: Preharvest cost per acre, Sinaloa, Mexico, 1967/68 season

(Yield: 110 crates marketed) 1/								
Item	Annual hours	Labor 2/ Dollars	Equipment Dollars	Material	Cost of materials Dollars	Combined costs Dollars	Total cost Dollars	
Operation:								
Plow.....	1.63	0.75	11.45			12.20		
Disk (2 times).....	2.43	1.12	11.70			12.82		
Level (2 times).....	.81	.37	6.64			7.01		
Mark.....	.81	.59	1.24			1.83		
Plant.....	12.96	3.41	---	Seed, 2 lbs. @ \$27.00 lb.	54.00	57.41		
Irrigate (11 times).....	63.70	21.02	10.00	Water	3.89	34.91		
Replant.....	3.24	.85	---			.85		
Weed and hoe (3 times).....	101.54	26.40	---			26.40		
Cultivate (3 times).....	2.43	1.12	8.50			9.62		
Vine tipping (early runner stage).....	13.12	3.41	---			3.41		
Training vines (4 times).....	52.42	13.63	---			13.63		
Pollinization.....	10.38	2.70	---	Beehive rental	6.80	9.50		
Spray and dust (4 times).....	6.54	1.70	---	Insecticides and fungicides	19.43	21.13		
Fertilization.....	.81	.37	2.95	Fertilizer	16.19	19.51		
Fertilize by hand.....	2.55	.67	---			.67		
Other labor expenses.....	---	7.82	---			7.82		
Total growing cost.....		85.93	52.48		100.31		238.72	
Cash overhead:								
Rent, land.....						32.39		
Interest on production capital (9 pct. 5 mo.).....						8.95		
Other.....						11.94	53.28	
Total cash cost.....							292.00	
Noncash overhead:								
Equipment investment (\$324.63):								
Depreciation.....						35.05		
Interest (9 pct.).....						14.61	49.66	
Total all costs.....							341.66	
Total cost per marketed crate.....							3.11	

1/ Yield: 85 export crates  
25 domestic crates  
110 crates marketed

2/ Labor: machine operators, \$0.46 per hour; irrigators, \$0.33 per hour; supervisors, \$0.37 per hour; field hands, \$0.26 per hour.

Table 55.--Strawberries: Preharvest cost per acre, Dade County, Florida, 1967/68 season

(Yield: 1,510 12-pint flats)						
Item	: Annual : : hours :	: Labor : : 1/ :	: Equipment :	Material	: Cost of : : materials :	: Combined : Total : costs : cost
		<u>Dollars</u>	<u>Dollars</u>		<u>Dollars</u>	<u>Dollars</u> <u>Dollars</u>
Operation:						
Plow cover crop.....	1.10	1.38	2.09			3.47
Disk (6 times).....	4.50	5.62	9.22			14.84
Fertilize.....	1.90	2.38	2.47	4-8-8, 2,000 lbs. @ \$0.0300 lb.	60.00	64.85
Bed and rebed (2 times).....	4.58	5.72	8.24			13.96
Set plants.....	64.29	73.93	---	Plants, 24,500 @ \$8.70 thou.	213.15	287.08
Lay plastic.....	2.22	50.06	4.44	Roll, 4.8 @ \$17.00	81.56	136.06
Scare birds.....	20.00	23.00	---	Shotgun shells	5.00	28.00
Spray (18 times).....	7.56	9.45	13.99	Insecticides, fungicides, and nutritional materials	82.76	106.20
Irrigate (23 times).....	14.72	16.93	44.16	0-20-0, 1,000 lbs. @ \$0.0250 lb. 13-0-44, 20 lbs. @ \$0.0550 lb.	25.00 1.10	87.19
Cultivate middles (2 times).....	2.64	3.30	4.22			7.52
Mulch middles.....	50.62	58.21	---	Hay, 76 bales @ \$0.56 bale	42.56	100.77
Weed and pull runners (4 times).....	112.84	129.77	---			129.77
Mow tops.....	.75	.94	1.50			2.44
Remove plastic.....	2.00	2.50	3.00			5.50
Other labor expense.....	---	38.32	---	Water charge @ \$2.00	2.00	40.32
Total growing cost.....		421.51	93.33		513.13	1,027.97
Cash overhead:						
Rent, land.....						33.87
Interest on production capital (6 pct. 5 mo.).....						25.70
Other (telephone, insurance, accounting)...						51.40
Total cash cost.....						1,138.94
Noncash overhead:						
Equipment investment (\$858.40):						93.81
Depreciation.....						25.75
Interest (6 pct.).....						119.56
Total all costs.....						1,258.50
Total cost per flat.....						.83

1/ Labor: machine operations, \$1.25 per hour; hand operations, \$1.15 per hour.

Table 56.--Strawberries: Preharvest cost per acre, Plant City area, Florida, 1967/68 season

(Yield: 1,100 12-pint flats)								
Item	Annual hours	Labor 1/	Equipment	Material	Cost of materials	Combined costs	Total cost	
		Dollars	Dollars		Dollars	Dollars	Dollars	
Operation:								
Disk (6 times).....	5.40	6.75	8.91			15.66		
Fumigate.....	.65	.81	.94	Fumigant	5.00	6.75		
Fertilize.....	1.81	2.26	2.17	6-8-12, 3,000 lbs. @ \$0.0310 lb.	93.00			
Bed.....	2.00	2.50	2.80	Sludge, 993 lbs. @ \$0.0112 lb.	11.12	108.55		
Lay plastic.....	2.22	5.11	3.44			5.30		
Irrigate (include fertilizer).....	22.76	26.17	45.52	Roll, 4.5 @ \$17.00	76.50	85.05		
Set plants.....	75.00	86.25	---	2-20-18, 1 gallon @ \$2.75	2.75	74.44		
Weed (2 times).....	37.10	42.66	---	Plants, 22,800 @ \$8.00/thous.	182.40	268.65		
Plow middles (3 times).....	3.96	4.95	5.54			42.66		
Spray (20 times).....	8.00	10.00	12.00	Insecticides, fungicides, and		10.49		
				nutritional materials	87.68	109.68		
Scare birds.....	20.00	23.00	---	Shotgun shells	5.00	28.00		
Mow tops.....	.90	1.12	1.08			2.20		
Remove plastic.....	2.00	2.50	2.40			4.90		
Other labor expenses.....	---	21.40	---	Water charge @ \$2.00	2.00	23.40		
Total growing cost.....		235.48	84.80		465.45		785.73	
Cash overhead:								
Rent, land.....						25.00		
Interest on production capital (6 pct., 5 mo):						19.64		
Other (telephone, insurance, accounting)....						39.29	83.93	
Total cash cost.....							869.66	
Noncash overhead:								
Equipment investment (\$1,352.12):								
Depreciation.....						111.75		
Interest (6 pct.).....						40.59	152.34	
Total all costs.....							1,022.00	
Total cost per flat.....							.93	

1/ Labor: machine operations, \$1.25 per hour; hand operations, \$1.15 per hour.

Table 57.--Strawberries: Preharvest cost per acre, Texas, 1967/68 season

(Yield: 400 12-pint flats)								
Item	: Annual : : hours :	Labor : : 1/ :	Equipment : :	Material	: Cost of : : materials :	: Combined : : costs :	: Total : : cost :	
		<u>Dollars</u>	<u>Dollars</u>		<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>	
Operation:								
Plow.....	1.0	1.25	1.40				2.65	
Disk (3 times).....	2.3	2.88	3.22				6.10	
Bed and rebed (10 times).....	8.3	10.38	11.21				21.59	
Level.....	.9	1.13	.99				2.12	
Fertilize.....	.8	1.00	1.00	10-20-10, 250 lbs. @ \$0.04	10.00		12.00	
Mark and make rows.....	1.8	2.25	1.08				3.33	
Set irrigation pipe.....	1.7	2.13	---				2.13	
Preirrigate.....	1.0	1.25	.80				2.05	
Plant.....	80.0	100.00	---	Plants, 30,000 @ \$8.00 thou.	240.00		340.00	
Irrigate (17 times).....	17.0	21.25	13.60				34.85	
Replant (1/4 time).....	16.0	20.00	---	Plants, 7,500 @ \$8.00 thou.	60.00		80.00	
Hoe (4 times).....	70.0	87.50	---				87.50	
Cultivate (12 times).....	15.2	19.00	23.56				42.56	
Dust or spray (3 times).....	1.6	2.00	1.79	Spray material, 90 lbs. sulfur @ \$0.12	10.80		14.59	
Fertilize, sidedress (2 times).....	2.1	2.63	3.26	10-20-10, 350 lbs. @ \$0.04	14.00		19.89	
Other labor expenses.....	---	27.47	---				27.47	
Total growing cost.....		302.12	61.91		334.80		698.83	
Cash overhead:								
Rent, land.....							25.00	
Interest production capital (6 pct., 6 mo.)							20.96	
Other.....							34.94	80.90
Total cash cost.....								779.73
Noncash overhead:								
Equipment investment (\$674.07):								
Depreciation.....							41.75	
Interest (6 pct.).....							13.28	55.03
Total all costs.....								834.76
Total cost per flat.....								2.09

1/ Labor: machine operations, \$1.25 per hour; hand operations, \$1.25 per hour.

Table 58.--Strawberries: Preharvest cost per acre, California, 1967/68 season 1/

(Yield: 3,500 12-pint flats)								
Item	: Annual : : hours :	Labor : 2/	: Equipment :	Material	: Cost of : : materials :	Combined : costs	Total : cost	
		Dollars	Dollars		Dollars	Dollars	Dollars	
Operation:								
Land preparation.....	15	30.00	16.50			46.50		
Grade Stake.....	5	10.00	---			10.00		
Fumigate.....	1	2.00	1.10	Fumigant, (2MB+1CP), 225 lbs.				
				3/4-1 mm. polyethylene cover	220.00	223.10		
Pre-irrigate.....	2	3.00	---	Water, 6 inches @ \$1.50	9.00	12.00		
Plant.....	3/45	71.50	2.20	Plants, 25,000 @ \$0.20 thou.	500.00	573.70		
Sprinkle, irrigate (20 times).....	40	60.00	52.80	Water, 30 inches @ \$1.50	45.00	157.80		
Furrow irrigate.....	48	72.00	---	Water, 36 inches @ \$1.50	54.00	126.00		
Weed, 3 times, and remove runners (2 times):	66	99.00	---			99.00		
Fertilizer (4 times).....	4	8.00	4.40	Fertilizer, chemical and manure	137.60	150.00		
Prune.....	55	82.50	---			82.50		
Apply plastic <u>4/</u> .....	44	66.00	---	Plastic, 200 lbs., 1 1/4 mm., 32 in. perforated @ \$0.49	98.00	164.00		
				Miticides, insecticides, and fungicides	50.70	60.00		
Remove plastic.....	12	18.00	---			18.00		
Total growing cost.....		528.00	80.30		1,114.30		1,722.60	
Cash overhead:								
Rent, land.....						150.00		
Miscellaneous.....						25.00	175.00	
Total cash cost.....							1,897.60	
Noncash overhead:								
Equipment investment (\$1,360.00) <u>5/</u> :								
Depreciation.....						136.00		
Interest (6 pct.).....						40.80	176.80	
Total all costs.....							2,074.40	
Total cost per flat.....								.59

1/ Based on sample production cost data prepared by the California Agricultural Extension Service.

2/ Labor: hand operations, \$1.50 per hour; equipment operators, \$2.00 per hour.

3/ Includes 2 hours of tractor operation.

4/ Includes training of plants through polyethylene training growth.

5/ Based on per acre costs assuming a 10-acre planting.

Table 59.--Strawberries: Preharvest cost per acre, Mexico, 1967/68 season

(Yield: 610 12-pint export flats)

Item	Annual hours	Labor 1/	Equip- ment	Material	Cost of materials	Combined costs	Total cost
		Dollars	Dollars		Dollars	Dollars	Dollars
Operation:							
Plow.....	0.91	0.32	4.46			4.78	
Subsoil (3 times).....	.74	.26	4.07			4.33	
Disk (3 times).....	1.45	.51	8.41			8.92	
Level (2 times).....	.69	.24	4.10			4.34	
Fumigate.....	.32	.11	1.60	PCNB, 36 lbs. @ \$1.07 lb.	38.52	40.23	
Mark rows.....	.32	.11	.99			1.10	
Press beds.....	.40	.14	1.90			2.04	
Make ditches.....	.32	.11	1.68			1.79	
Irrigate (50 times).....	42.31	10.58	21.16	Water	.32	32.06	
Haul plants.....	.45	.11	.45	Plants, 25,000 @ \$7.20 thou.	180.00	180.56	
Set plants (direct system).....	70.00	12.60	---			12.60	
Haul fertilizer (4 times).....	1.38	.33	1.38			1.71	
Fertilize by hand (4 times).....	10.36	1.86	---	10-20-10, 530 lbs. @ \$0.044 lb.	23.32		
				18-46-0, 90 lbs. @ \$0.076 lb.	6.84	43.90	
				Ammonium sulfate, 270 lbs. @ \$0.044 lb.	11.88		
Cultivate by mule (6 times).....	15.55	2.80	5.05			7.85	
Weed and cut runners (5 times).....	248.64	44.76	---			44.76	
Spray, motorized back pack (10 times):	37.57	6.76	3.76	Insecticides, fungicides, and nutritional materials	32.40	42.92	
Road repair.....	.61	.21	2.78			2.99	
Scare birds.....	20.24	3.64	---	Shotgun shells	1.30	4.94	
Other labor expenses.....	---	8.54	---	Soil tests	4.05	12.59	
Total growing cost.....		93.99	61.79		298.63		454.41
Cash overhead:							
Rent, land.....						64.78	
Interest on production capital (9 pct., 7 mo.).....						23.86	
Miscellaneous.....						22.72	111.36
Total cash cost.....							565.77
Noncash overhead:							
Equipment investment (\$130.85):							
Depreciation.....						14.45	
Interest (9 pct.).....						5.89	20.34
Total all costs.....							586.11
Prorated fresh market cost.....							226.55
Total cost per export flat.....							.37

1/ Labor: Machine operators, \$0.35 per hour; truck drivers, \$0.24 per hour; irrigators, \$0.25 per hour; field hands, \$0.18 per hour.

Table 60.--Selected winter vegetables: Major production inputs and proportion of total production cost, by selected locations, United States and Mexico, 1967/68 season

Crop and input	Florida		Texas	California	Mexico	
	Southeast	Other			Sinaloa	Other
	Percent	Percent	Percent	Percent	Percent	Percent
Ground tomatoes:						
Labor.....	6	---	17	---	---	---
Equipment operation.....	10	---	12	---	---	---
Fertilizer.....	27	---	11	---	---	---
Pesticides.....	35	---	12	---	---	---
Land rent.....	9	---	14	---	---	---
Equipment depreciation and interest.....	6	---	18	---	---	---
Water.....	<u>1</u> /	---	4	---	---	---
Other <u>2</u> /.....	7	---	12	---	---	---
Staked tomatoes:						
Labor.....	39	---	---	40	21	---
Equipment operation.....	5	---	---	3	12	---
Fertilizer.....	19	---	---	7	14	---
Pesticides.....	8	---	---	1	20	---
Land rent.....	6	---	---	2	5	---
Equipment depreciation and interest.....	1	---	---	12	8	---
Water.....	<u>1</u> /	---	---	2	1	---
Other.....	22	---	---	33	19	---
Peppers, bell:						
Labor.....	29	---	24	---	27	---
Equipment operation.....	7	---	11	---	13	---
Fertilizer.....	28	---	13	---	5	---
Pesticides.....	13	---	8	---	26	---
Land rent.....	6	---	9	---	7	---
Equipment depreciation and interest.....	2	---	17	---	2	---
Water.....	<u>1</u> /	---	5	---	1	---
Other.....	15	---	13	---	19	---

See footnotes at end of table.

Table 60.--Selected winter vegetables: Major production inputs and proportion of total production cost, by selected locations, United States and Mexico, 1967/68 season--Continued

Crop and input	Florida		Texas	California	Mexico	
	Southeast	Other			Sinaloa	Other
	Percent	Percent	Percent	Percent	Percent	Percent
Cucumbers:						
Labor.....	14	17	20	30	13	---
Equipment operation.....	18	13	12	3	26	---
Fertilizer.....	29	32	11	11	21	---
Pesticides.....	11	11	12	2	12	---
Land rent.....	9	5	13	2	8	---
Equipment depreciation and interest.....	11	11	19	17	9	---
Water.....	$\frac{1}{8}$	1	3	2	1	---
Other.....	8	10	10	33	10	---
Eggplant:						
Labor.....	19	---	---	---	21	---
Equipment operation.....	7	---	---	---	13	---
Fertilizer.....	23	---	---	---	12	---
Pesticides.....	26	---	---	---	10	---
Land rent.....	7	---	---	---	7	---
Equipment depreciation and interest.....	8	---	---	---	4	---
Water.....	$\frac{1}{10}$	---	---	---	1	---
Other.....	10	---	---	---	32	---
Cantaloup:						
Labor.....	---	---	26	31	25	19
Equipment operation.....	---	---	14	8	15	20
Fertilizer.....	---	---	12	12	5	13
Pesticides.....	---	---	8	16	6	11
Land rent.....	---	---	14	20	9	6
Equipment depreciation and interest.....	---	---	14	$\frac{3}{3}$	15	18
Water.....	---	---	4	3	1	3
Other.....	---	---	8	10	24	10

See footnotes at end of table.

Continued--

Table 60.--Selected winter vegetables: Major production inputs and proportion of total production cost, by selected locations, United States and Mexico, 1967/68 season--Continued

Crop and input	Florida		Texas	California	Mexico	
	Southeast	Other			Sinaloa	Other
	Percent	Percent	Percent	Percent	Percent	Percent
Strawberries:						
Labor.....	33	23	36	25	---	16
Equipment operation.....	7	8	7	4	---	11
Fertilizer.....	7	10	3	7	---	7
Pesticides.....	17	17	1	18	---	12
Land rent.....	3	2	3	7	---	11
Equipment depreciation and interest.....	10	15	7	9	---	3
Water.....	<u>1</u> /	<u>1</u> /	<u>1</u> /	5	---	<u>1</u> /
Other.....	23	25	43	25	---	40

1/ Less than 0.5 percent.

2/ Includes seed or plants; stake, wire and twine; interest on production capital; and miscellaneous inputs.

3/ Equipment owned by custom operator.

Table 61.--Vine-ripe and mature-green tomatoes: Cost of harvesting, packing, and selling f.o.b., by selected locations, United States and Mexico, 1966/67 and 1967/68 seasons

Item	Vine-ripe tomatoes		Mature-green tomatoes	
	1967/68 season		1966/67 season	1967/68 season
	South	Northwest	South	Texas (Rio
	Florida	Mexico	Florida	Grande Valley)
	Cost per 20-pound equivalent		Cost per 40-pound equivalent	
	Dollars	Dollars	Dollars	Dollars
Harvesting:				
Labor.....	0.377	1/0.135	0.35	---
Hauling and other expenses.....	.095	1/ .042	.20	---
Total.....	.472	1/ .177	.55	0.668
Packing and selling:				
Labor.....	.339	.087	.245	.369
Materials.....	.287	.279	.336	.457
Overhead and selling..	.190	.072	.228	.300
Total.....	.816	.438	.809	1.126
Mexican export cost to				
Nogales, Ariz.:				
Union and association dues.....	---	.018	---	---
U.S. import duty.....	---	.393	---	---
U.S. customs and other services.....	---	.022	---	---
Mexican taxes, duties, and services.....	---	.074	---	---
Freight and related costs.....	---	.296	---	---
Labor, materials, and miscellaneous expenses.....	---	.019	---	---
Total shipping	---	.822	---	---
Sales commission and promotion.....	---	.200	---	---
Total shipping and selling.....	---	1.022	---	---
Total f.o.b. marketing cost.....	1.288	1.637	1.359	1.794

1/ Prorated to domestic and export packs.

Table 62.--Cucumbers: Cost per bushel of harvesting, packing, and selling f.o.b., by selected locations, United States and Mexico, 1966/67 and 1967/68 seasons

Item	South Florida 1966/67 season	Northwest Mexico 1967/68 season	Texas (Rio Grande Valley) 1966/67 season
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Harvesting:			
Labor.....	0.622	1/0.288	---
Hauling and other expenses .....	.179	1/ .071	---
Total.....	.801	1/ .359	0.60
Packing and selling:			
Labor.....	.397	.154	---
Materials.....	.485	.593	---
Overhead and selling.....	.306	.177	---
Total.....	1.188	.924	2/1.25
Mexican export cost to Nogales, Ariz.:			
Union and association dues.....	---	.023	---
U.S. import duty.....	---	1.282	---
U.S. customs and other services.....	---	.038	---
Mexican taxes, duties, and services.....	---	.252	---
Freight and related costs.....	---	.625	---
Labor, materials, and miscellaneous expenses..	---	.013	---
Total shipping.....	---	2.233	---
Sales commission and promotion.....	---	.441	---
Total shipping and selling.....	---	2.674	---
Total f.o.b. marketing costs.....	1.989	3.957	1.85

1/ Prorated to domestic and export packs.

2/ Packinghouse charge to growing operations.

Table 63.--Peppers: Cost per bushel of harvesting, packing, and selling f.o.b., by selected locations, United States and Mexico, 1966/67 and 1967/68 seasons

Item	South	Northwest	Texas (Rio
	Florida	Mexico	Grande Valley)
	1966/67 season	1967-68 season	
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Harvesting:			
Labor.....	0.400	0.152	---
Hauling and other expenses.....	.150	.089	---
Total.....	.550	.241	0.369
Packing and selling:			
Labor.....	.369	.180	---
Materials.....	.430	.644	---
Overhead and selling..	.339	.123	---
Total.....	1.138	.947	1/1.342
Mexican export cost to			
Nogales, Ariz.:			
Union and association dues.....	---	.020	---
U.S. import duty	---	.727	---
U.S. customs and other services.....	---	.016	---
Mexican taxes, duties, and services.....	---	.132	---
Freight and related cost.....	---	.542	---
Labor, materials, and miscellaneous expenses.....	---	.010	---
Total shipping.....	---	1.447	---
Sales commission.....	---	.344	---
Total shipping and selling.....	---	1.791	---
Total f.o.b. marketing cost.....	1.688	2.979	1.711

1/ Packinghouse charge to growing operations.

Table 64.--Eggplant: Cost per bushel of harvesting, packing, and selling f.o.b., by selected locations, Florida and Mexico, 1966/67 and 1967/68 seasons

Item	South Florida <u>1/</u>	Northwest Mexico
	1966/67 season	1967/68 season
	<u>Dollars</u>	<u>Dollars</u>
Harvesting:		
Labor.....	---	0.172
Hauling and other expenses.....	0.111	.068
Total.....	.111	.240
Packing and selling:		
Labor.....	<u>2/</u> .404	.106
Materials.....	.527	.531
Overhead and selling.....	.143	.087
Total.....	1.074	.724
Mexican export cost to Nogales, Ariz.:		
Union and association dues.....	---	.021
U.S. import duty.....	---	.333
U.S. customs and other services.....	---	.017
Mexican taxes, duties, and services..	---	.046
Freight and related cost.....	---	.436
Labor, materials, and miscellaneous : expenses.....	---	.010
Total shipping.....		.863
Sales commission.....	---	.169
Total shipping and selling.....	---	1.032
Total f.o.b. marketing costs.....	1.185	1.996

1/ Brooke, Donald L., Costs and Returns from Vegetable Crops in Florida, Econ. Mimeo. Rpt. EC 68-4, Dept. of Agr. Econ., Fla. Agr. Expt. Sta.

2/ Includes picking.

Table 65.--Cantaloups: Cost per 88-pound crate of harvesting, packing, and selling f.o.b., by selected locations, Mexico and Texas, 1967/68 season

Item	Northwest Mexico	Mexico (Apatzingan)	Texas (Rio Grande Valley)
	<u>Dollars</u>	<u>Dollars</u>	<u>Dollars</u>
Harvesting:			
Labor.....	<u>1/0.351</u>	<u>1/0.215</u>	---
Hauling and other expenses.....	<u>1/ .099</u>	<u>1/ .155</u>	---
Total.....	<u>1/ .450</u>	<u>1/ .370</u>	1.061
Packing and selling:			
Labor.....	.317	---	---
Materials.....	.964	---	---
Overhead and selling.....	.596	---	---
Total.....	1.877	<u>2/1.772</u>	<u>2/2.363</u>
Mexican export cost to:	Nogales, Ariz.	Laredo, Tex.	
	<u>Dollars</u>	<u>Dollars</u>	
Union and association dues.....	0.059	0.099	
U.S. import duty.....	<u>3/1.575</u>	<u>3/1.575</u>	
U.S. customs and other services.....	.040	.091	
Mexican taxes, duties, and services.....	.717	.620	
Freight and related costs.....	1.128	.798	
Labor, materials, and miscellaneous expenses.....	.078	.068	
Total shipping.....	<u>3.597</u>	<u>3.251</u>	
Sales commission.....	<u>4/ .729</u>	<u>4/ .729</u>	
Total shipping and selling.....	<u>4.326</u>	<u>3.980</u>	
Total f.o.b. marketing cost.....	6.653	6.122	3.424

1/ Prorated to domestic and export pack.

2/ Packinghouse charge to growing operation.

3/ 35 percent ad valorem at \$4.50 per crate f.o.b. Nogales and Laredo.

4/ 8 percent of value in New York.

Table 66.--Strawberries: Cost per 12-pint flat of harvesting, packing, and selling f.o.b., South Florida and Southwest Mexico, 1967/68 season

Item	South Florida	Southwest Mexico
	<u>Dollars</u>	<u>Dollars</u>
Harvesting:		
Labor.....	---	<u>1/0.134</u>
Hauling and other expenses.....	0.039	<u>1/ .034</u>
Total.....	.039	<u>1/ .168</u>
Packing:		
Labor.....	<u>2/1.000</u>	.080
Materials.....	.370	.420
Precooling and overhead.....	.100	.060
Commission 10 percent f.o.b. ....	.330	
Total.....	<u>1.800</u>	<u>.560</u>
Mexican export cost to Laredo, Tex.:		
Union and association dues.....	---	.005
U.S. import duty.....	---	.083
Mexican duties and crossing charges...	---	.367
Freight and related cost.....	---	.280
Total shipping.....	---	<u>.735</u>
Selling association share.....	---	.386
Shipping share.....	---	.386
Total shipping and selling.....	---	<u>1.507</u>
Total f.o.b. marketing cost.....	1.839	2.235
<u>1/</u> Prorated to fresh and frozen packs.		
<u>2/</u> Picking and packing.		

Table 67.--Winter produce: Delivery cost per container from shipping point to specified destination, United States, 1967/68 season.

Crop and shipping point	Unit	Delivery cost to --		
		New York	Chicago	San Francisco
		<u>Dollars</u>		
Tomatoes:				
Vine-ripe:	20-pound lug			
Florida .....		0.45	0.50	0.80
Nogales, Ariz. ....		.93	.61	.39
Mature green:				
Florida .....	40-pound lug	.80	.90	1.50
Cucumbers:	Bushel			
Florida .....		1.10	1.15	1.80
Nogales, Ariz. ....		2.00	1.31	.85
Peppers:	do.			
Florida .....		.80	.90	1.30
Nogales, Ariz. ....		1.62	1.06	.69
Eggplant:	do.			
Florida .....		.85	.95	1.35
Nogales, Ariz. ....		1.68	1.10	.71
Cantaloups:	88-pound crate:			
Texas, Rio Grande Valley:		2.37	1.58	2.08
Nogales, Ariz. ....		3.01	1.97	1.27
Strawberries:	12-pint flat			
Florida .....		.39	.44	.70
Laredo, Tex. ....		.81	.53	.34

Table 68.--Tomatoes: Total recorded seasonal movement in 40-pound cartons, and percentage distribution, by type, Florida, other U.S. points, and Mexico, 1963-67 seasons

Period <u>1/</u>	Florida			Mexico			Other	Total
	Mature- green	Vine- ripe	Total	Mature- green	Vine- ripe	Total	U. S.	
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>
1963/64.....	11,357,700	3,782,300	15,140,000	2,349,000	5,021,400	7,370,400	1,813,300	24,323,700
1964/65.....	10,204,300	5,127,600	15,331,900	1,619,400	6,275,200	7,894,600	2,051,400	25,277,900
1965/66.....	9,027,800	5,711,000	14,738,800	930,600	8,729,400	9,660,000	1,432,700	25,836,500
1966/67.....	10,793,900	4,565,500	15,359,400	514,900	9,648,900	10,163,800	1,729,000	27,252,200
1967/68.....	<u>2/</u> 9,872,400	<u>2/</u> 3,995,000	13,847,400	96,500	9,282,600	9,379,100	1,433,700	24,660,200
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	
1963/64.....	50.5	16.8	67.3	10.4	22.3	32.7	7.5	---
1964/65.....	43.9	22.1	66.0	7.0	27.0	34.0	8.1	---
1965/66.....	37.0	23.4	60.4	3.8	35.8	39.6	5.5	---
1966/67.....	42.3	17.9	60.2	2.0	37.8	39.8	6.3	---
1967/68.....	42.5	17.1	59.6	.4	40.0	40.4	5.8	---

1/ December-May season.

2/ Preliminary regarding allocation between vine-ripe and mature-green.

Source: Tomatoes, Florida Department of Agriculture, Division of Marketing, EFS, August 1, 1967.

Table 69.--Chronology of changes in selected tomato sizes and corresponding prices required for continuity in charting price quotations for Chicago market, 1966/67 and 1967/68 seasons 1/

Florida				:	Mexico					
Mature-green		:	Vine-ripe		:	Vine-ripe				
Period	:	Size	:	Period	:	Size	:	Period	:	Size
1966/67:			1966/67:			1966/67:				
Dec. 1-7		6x6		Dec. 1		5x6, 6x6		Dec. 6-8		5x6
Dec. 9-12		6x7		Dec. 2-						
				Mar. 22		5x5, 5x6		Dec. 9-15		6x6
Dec. 15-16		5x6, 6x6		Mar. 23-				Dec. 19-		
				Apr. 7		5x6, 6x6		Jan. 10		5x6
Dec. 19-				Apr. 10-				Jan. 19-		
Apr. 17		6x6		June 13		5x5, 5x6		Apr. 26		5x5, 5x6
Apr. 18		5x6, 6x6						May 4-		
Apr. 19-								June 12		5x6, 6x6
May 29		6x6								
May 31-										
June 1		5x6, 6x6								
June 14		5x6								
1967/68:			1967/68:			1967/68:				
Dec. 1-15		6x6		Dec. 4-				Dec. 19-27		6x6
				Jan. 8		5x5, 5x6				
Dec. 26-29		5x6, 6x6		Jan. 9-23		5x6, 6x6		Dec. 28		5x5
Jan. 3		6x7		Jan. 25-				Jan. 2-		
Feb. 7-				Mar. 29		5x5, 5x6		Feb. 16		5x6
Mar. 11		6x6								
Apr. 9		5x6, 6x6		Apr. 1-26		6x6, 6x7		Feb. 19-20		6x6
Apr. 10		5x6		May 1-						
				June 14		5x6, 6x6		Feb. 21		5x6
Apr. 12		6x6						Feb. 23-		
								Mar. 5		6x6
May 6-7		5x6						Mar. 6-		
May 10		6x7						May 22		5x6
May 13		6x6								
May 14-15		5x6, 6x6								
May 16-17		6x6								

1/ Marketing season December-May.

Table 70.--Civilian per capita marketings, New York City retail prices of fresh tomatoes for 1963-67 marketing seasons, and consumer price indexes, 1964-68

Period <u>1/</u>	Population eating from civilian supplies, 48 States, July 1, 1964- June 30, 1967	Total recorded movement of tomatoes in 40-pound cartons	Per capita marketings	Retail price per pound, New York City		Consumer price index 1957-59=100
				Tube	Loose	
	<u>Millions</u>	<u>Number</u>	<u>Pounds</u>	<u>Cents</u>	<u>Cents</u>	
1963/64.....	188.5	24,323,700	5.16	31.1	40.8	108.1
1964/65.....	191.0	25,277,900	5.29	33.6	41.2	109.1
1965/66.....	192.9	25,836,500	5.36	32.2	42.0	113.1
1966/67.....	194.7	27,252,200	5.60	33.7	42.8	116.3
1967/68.....	---	---	---	39.2	48.6	121.2

1/ Marketing season December-May.

Sources: U.S. Bureau of the Census; Tomatoes, Florida Dept. of Agr., Div. of Marketing, EFS, August 1, 1967; U.S. Bureau of Labor Statistics, data compiled for U.S. Department of Agriculture.

Table 71.--Matrix of price flexibilities and cross-flexibilities for various sizes of vine-ripe and mature-green tomatoes, weekly, 1966/67 season

(Zero constant solution, all variables entering)								
Type and size	Vine-ripe				Mature-green		:	:
	Percentage change in price for a				Percentage change:		:	:
	1 percent change in quantity of:				in price for a 1		Row	Multiple
	quantity of:				percent change in:		sums	R
	x <sub>1</sub> <sup>1/</sup> : x <sub>2</sub> <sup>1/</sup> : x <sub>3</sub> <sup>1/</sup> : x <sub>4</sub> <sup>1/</sup> :				x <sub>5</sub> <sup>1/</sup> : x <sub>6</sub> <sup>1/</sup> :		2/	2/
<hr/>								
	Percent	Percent	Percent	Percent	Percent	Percent		
Vine-ripe:								
4 x 4.....	-0.151	0	0	0	-0.042	0	-.193	.47
4 x 4½.....	- .081	0	0	0	- .052	0	-.133	.42
4 x 5.....	- .152	-0.001	0	0	- .040	0	-.193	.48
5 x 5.....	- .144	- .001	0	0	- .040	0	-.185	.48
5 x 6.....	- .107	- .008	0	-0.083	- .023	0	-.221	.45
6 x 6.....	- .222	- .078	-0.019	- .146	- .053	0	-.518	.49
6 x 6½.....	- .238	- .022	0	0	- .049	0	-.309	.61
6 x 7.....	- .244	- .084	- .192	- .098	- .132	0	-.750	.68
7 x 7.....	- .183	0	- .086	- .070	- .096	0	-.435	.64
7 x 8.....	- .409	- .211	0	- .053	- .042	0	-.715	.71
Mature-green:								
5 x 6.....	- .106	- .043	- .048	- .141	- .038	0	-.376	.59
6 x 6.....	- .162	- .029	- .111	- .061	- .034	0	-.397	.47
6 x 7.....	- .117	0	- .050	- .106	- .056	0	-.329	.49
Average, all sizes.....	- .059	0	- .059	- .076	- .041	0	-.235	.43

1/ All quantity series with simple intercorrelations of  $r$  equal to or greater than .65 were combined to form the following variables:

Vine-ripe:  $x_1 = 4x_4 + 4x_{4\frac{1}{2}} + 4x_5 + 5x_5 + 6x_{6\frac{1}{2}}$ ;  $x_2 = 5x_6 + 6x_6$ ;  $x_3 = 6x_7$ ;  $x_4 = 7x_7 + 7x_8$ .

Mature-green:  $x_5 = 5x_6$ ;  $x_6 = 6x_6 + 6x_7 + 7x_7 + 7x_8$ .

Price series were not complete for 7x7 and 7x8 mature-green sizes.

2/ Row sums are makeshift estimates of price flexibilities for prices of particular sizes corresponding to a change in the total quantity of tomatoes.

Table 72.--Ripe tomatoes: Percentages of marketings by size, Florida and Mexico, 1966/67 season

Size	Florida		Mexico
	All sizes	4x5-7x8	All sizes
	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>
4x4.....	5.6	---	---
4x4½.....	5.6	---	---
4x5.....	8.0	9.1	0.7
5x5.....	10.3	11.7	6.5
5x6.....	31.6	36.0	18.2
6x6.....	18.9	21.5	29.2
6x6½.....	3.1	3.6	0
6x7.....	8.7	9.9	35.0
7x7.....	6.1	6.9	9.7
7x8.....	1.2	1.3	.7
Miscellaneous.....	<u>.9</u>	<u>---</u>	<u>---</u>
Total.....	100.0	100.0	100.0

Sources: Statistical Reporting Service, U.S. Department of Agriculture Survey, and CAADES records.

Table 73.--Rank of supply areas on basis of trade acceptance, by number of New York wholesalers responding, 1968

Item	Respondents						Total
	Rank of area <u>1/</u>						
	1	2	3	4	5		
	<u>Number</u>						
Tomatoes:							
California.....	2	5	1	0	0	8	
Florida.....	11	0	0	0	0	11	
Texas.....	0	0	3	2	0	5	
Mexico .....	1	3	1	3	0	8	
Cantaloups:							
California.....	8	2	0	0	0	10	
Texas.....	0	0	2	6	1	9	
Mexico.....	4	3	3	0	0	10	
Arizona.....	0	3	3	1	0	7	
Cucumbers:							
California.....	0	1	1	2	0	4	
Florida.....	11	1	0	0	0	12	
Texas.....	0	0	4	2	0	6	
Mexico.....	2	8	1	0	0	11	
Offshore.....	3	0	3	0	0	6	
Peppers:							
California.....	6	3	1	0	0	10	
Texas.....	9	3	1	0	0	13	
Mexico.....	1	4	5	0	0	10	
Arizona.....	2	1	2	3	0	8	
Strawberries:							
California.....	9	0	0	0	0	9	
Florida.....	0	6	2	0	0	8	
Texas.....	0	1	1	1	1	4	
Mexico.....	0	3	4	2	0	9	
Louisiana.....	0	0	1	1	0	2	

1/ Some respondents assigned the same rank to more than one supply area.

Table 74.--Rank of supply areas on basis of trade acceptance, by number of Chicago wholesalers responding, 1968

Item	Respondents						Total
	Rank of area <u>1/</u>						
	1	2	3	4	5		
	<u>Number</u>						
-----							
Tomatoes:							
California.....	3	4	0	0	0		7
Florida.....	5	3	0	0	0		8
Texas.....	0	0	4	3	0		7
Mexico.....	0	1	4	0	0		5
Cantaloups:							
California.....	5	0	0	0	0		5
Texas.....	0	0	3	2	0		5
Mexico.....	0	1	2	1	0		4
Arizona.....	1	4	0	0	0		5
Cucumbers:							
California.....	0	1	0	1	0		2
Florida.....	6	0	0	0	0		6
Texas.....	1	3	1	0	0		5
Mexico.....	1	2	1	1	0		5
Offshore.....	1	0	1	1	1		4
Peppers:							
California.....	2	2	1	0	0		5
Florida.....	6	0	0	0	0		6
Texas.....	3	1	2	0	0		6
Mexico.....	2	0	0	3	0		5
Offshore.....	0	0	0	0	1		1
Strawberries:							
California.....	6	0	0	0	0		6
Florida.....	1	3	1	0	0		5
Texas.....	1	0	2	1	1		5
Mexico.....	0	4	2	1	0		7

1/ Some respondents assigned the same rank to more than one supply area.

Table 75.--Rank of supply areas on basis of trade acceptance, by number of New York wholesale market buyers responding, 1968

Item	Respondents					Total
	Rank of area <u>1</u> /					
	1	2	3	4	5	
	<u>Number</u>					
Tomatoes:						
California.....	2	5	0	0	0	7
Florida.....	6	1	0	0	0	7
Texas.....	1	0	1	3	0	5
Mexico.....	1	1	5	0	0	7
Cantaloups:						
California.....	8	0	0	0	0	8
Texas.....	0	0	2	2	1	5
Mexico.....	2	5	0	0	0	7
Arizona.....	1	2	5	0	0	8
Cucumbers:						
California.....	0	0	0	2	0	2
Florida.....	9	0	0	0	0	9
Texas.....	0	0	5	1	0	6
Mexico.....	1	7	0	0	0	8
Offshore.....	1	1	0	0	0	2
Peppers:						
California.....	5	3	0	1	0	9
Florida.....	6	1	1	0	0	8
Texas.....	1	1	3	3	0	8
Mexico.....	0	1	3	3	0	7
Offshore.....	0	0	0	0	1	1
Strawberries:						
California.....	8	0	0	0	0	8
Florida.....	1	6	0	0	0	7
Texas.....	0	0	0	3	0	3
Mexico.....	2	0	5	0	0	7
Louisiana.....	0	0	0	1	0	1

1/ Some respondents assigned the same rank to more than one supply area.

Table 76.--Rank of supply areas on basis of trade acceptance, by number of Chicago wholesale market buyers responding, 1968

Item	Respondents						Total
	Rank of area <u>1/</u>						
	1	2	3	4	5		
<hr/>							
	<hr style="border-top: 1px dashed black;"/>						
<hr/>							
Tomatoes:							
California.....	7	1	0	1	0	9	
Florida.....	4	2	3	0	0	9	
Texas.....	0	0	2	4	0	6	
Mexico.....	0	5	1	0	0	6	
Cantaloups:							
California.....	6	1	0	0	0	7	
Texas.....	0	0	0	4	0	4	
Mexico.....	2	4	0	0	0	6	
Arizona.....	2	3	0	0	0	5	
Cucumbers:							
California.....	1	0	1	3	0	5	
Florida.....	8	1	0	0	0	9	
Texas.....	0	3	2	1	0	6	
Mexico.....	0	4	2	0	1	6	
Offshore.....	0	0	0	0	0	1	
Peppers:							
California.....	4	4	0	0	0	8	
Florida.....	6	3	0	0	0	9	
Texas.....	0	0	4	1	0	5	
Mexico.....	1	0	1	4	0	6	
Offshore.....	0	0	0	0	2	2	
Strawberries:							
California.....	8	0	0	0	0	8	
Florida.....	0	3	2	0	1	6	
Texas.....	0	0	0	5	1	6	
Mexico.....	0	3	2	1	0	6	
Louisiana.....	0	1	1	0	1	3	

1/ Some respondents assigned the same rank to more than one supply area.

Table 77.--Acres planted, percentage of total acreage, by crops, and ratio of cost of growing vine-ripe tomatoes to cost per acre for vegetables, melons, and strawberries in selected South Florida producing areas, 1965/66 season

Crop	Palm Beach East area (Broward-Martin)			Everglades area (Palm Beach West)			Dade area			Southwest Florida area (Lee, Collier, Hendry, Charlotte)		
	:Percentage:Vine-ripe			:Percentage:Vine-ripe			:Percentage:Vine-ripe			:Percentage:Vine-ripe		
	: Acres: of total : tomato			: Acres: of total : tomato			: Acres: of total : tomato			: Acres: of total : tomato		
	: acreage :cost ratio:			: acreage :cost ratio:			: acreage :cost ratio:			: acreage :cost ratio:		
	Number	Percent		Number	Percent		Number	Percent		Number	Percent	
Tomatoes:												
Vine-ripe.....	6,110	9.39	---	---	---	---	---	---	---	7,790	5.90	---
Mature-green...	2,220	3.41	---	---	---	---	18,980	45.24	3.96	11,250	23.80	4.20
Lima beans.....	280	.43	---	20	.03	---	---	---	---	---	---	---
Snap beans.....	27,480	42.24	11.16	6,700	9.62	17.78	---	---	---	---	---	---
Pole beans.....	---	---	---	---	---	---	6,810	16.23	5.21	---	---	---
Cabbage.....	650	1.00	---	2,900	4.16	10.05	500	1.19	---	580	1.23	---
Cantaloups.....	300	.46	---	---	---	---	110	.26	---	200	.42	---
Watermelons.....	1,800	2.77	---	---	---	---	---	---	---	12,300	26.03	---
Celery.....	---	---	---	9,600	13.79	---	---	---	---	---	---	---
Sweet corn.....	10,500	16.14	7.07	39,600	56.86	10.02	2,830	6.74	---	720	1.52	---
Cucumbers.....	2,100	3.23	5.77	50	.07	---	1,800	4.29	---	7,900	16.72	5.37
Eggplant.....	1,700	2.61	2.93	---	---	---	---	---	---	70	.15	---
Escarole.....	---	---	---	5,930	8.52	---	30	.07	---	---	---	---
Lettuce.....	---	---	---	2,800	4.02	---	110	.26	---	50	.11	---
Green peppers...	8,330	12.81	2.58	230	.33	---	---	---	---	6,270	13.27	3.42
Irish potatoes...	350	.54	---	1,630	2.34	6.95	6,800	16.20	5.53	3,260	6.90	5.45
Squash.....	2,770	4.26	7.74	180	.26	---	3,300	7.86	8.05	1,870	3.95	9.21
Strawberries.....	455	.70	---	---	---	---	695	1.66	---	---	---	---
Total.....	65,045			69,640			41,965			47,260		

Sources: Florida Agricultural Statistics, Vegetable Summary, Florida Department of Agriculture. Brooke, Donald L., Costs and Returns from Vegetable Crops in Florida, EC 67-8, Dept. of Agr. Econ., Fla. Agr. Expt. Sta., February 1, 1967.

Table 78.--Projection of exports of agricultural products, Mexico, 1965, 1970, and 1975

Commodity	Average 1958-62	Projection					
		1965		1970		1975	
		A	B	A	B	A	B
		-----1,000 metric tons-----					
Cotton.....	359	382	377	407	397	437	423
Coffee.....	83	94	91	105	99	118	108
Sugar.....	462	337	212	400	251	455	286
Beef.....	76	87	85	100	96	116	107
Fruits and vegetables:							
Tomatoes.....	136	151	147	168	158	187	171
Oranges.....	30	35	35	40	40	47	47
Strawberries.....	15	15	15	16	16	18	18
Cantaloups.....	40	44	43	50	46	53	50
Watermelons.....	24	27	26	28	28	30	30
Pineapples.....	19	19	19	21	21	24	24
Henequen.....	110	114	108	122	106	131	111
Cacao.....	6	8	7	12	7	14	8

Sources: Text and "Projections of Supply of and Demand for Agricultural Products in Mexico to 1965, 1970, and 1975", published for the U.S. Department of Agriculture, Economic Research Service, August 1966.

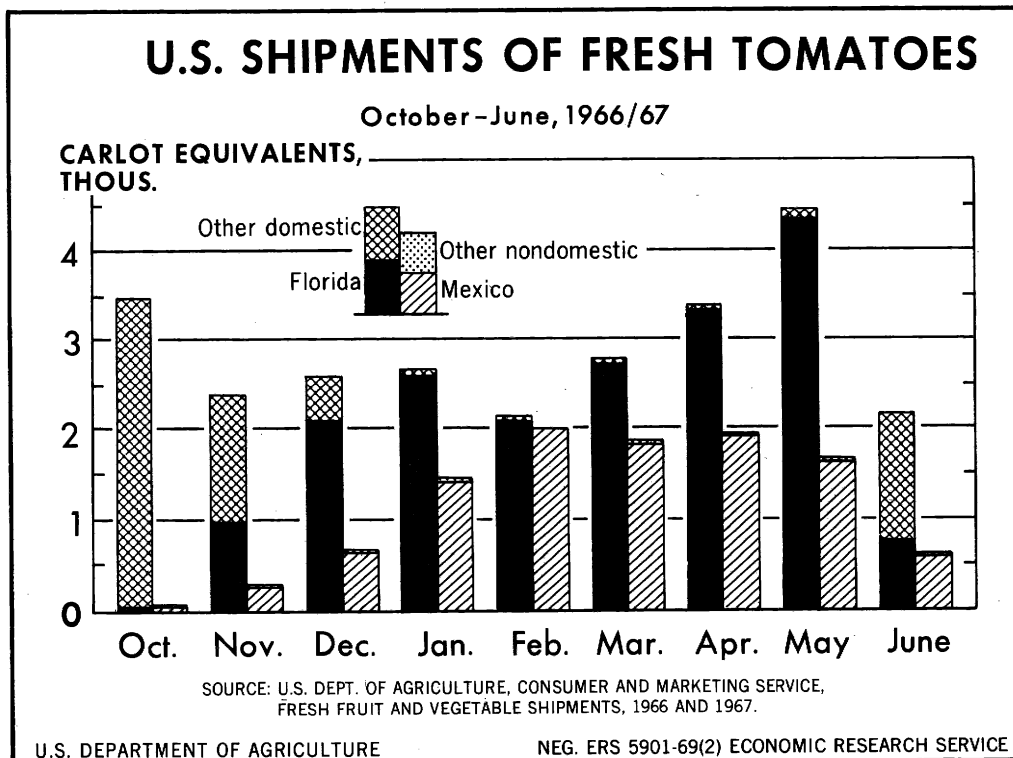


Figure 3

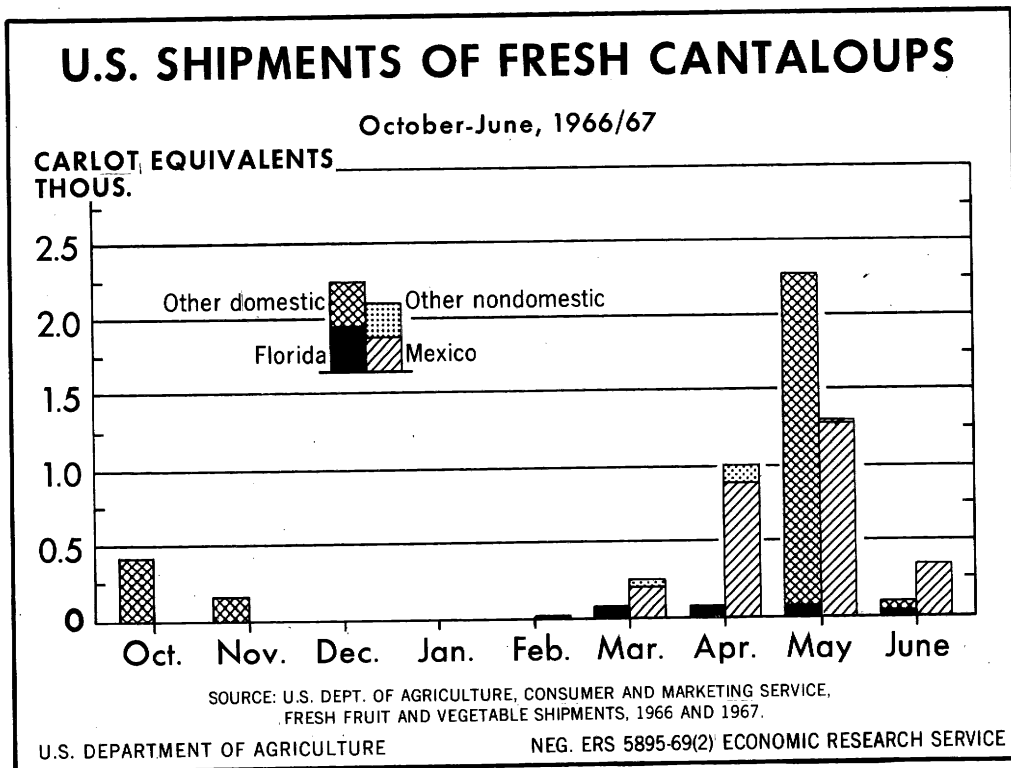


Figure 4

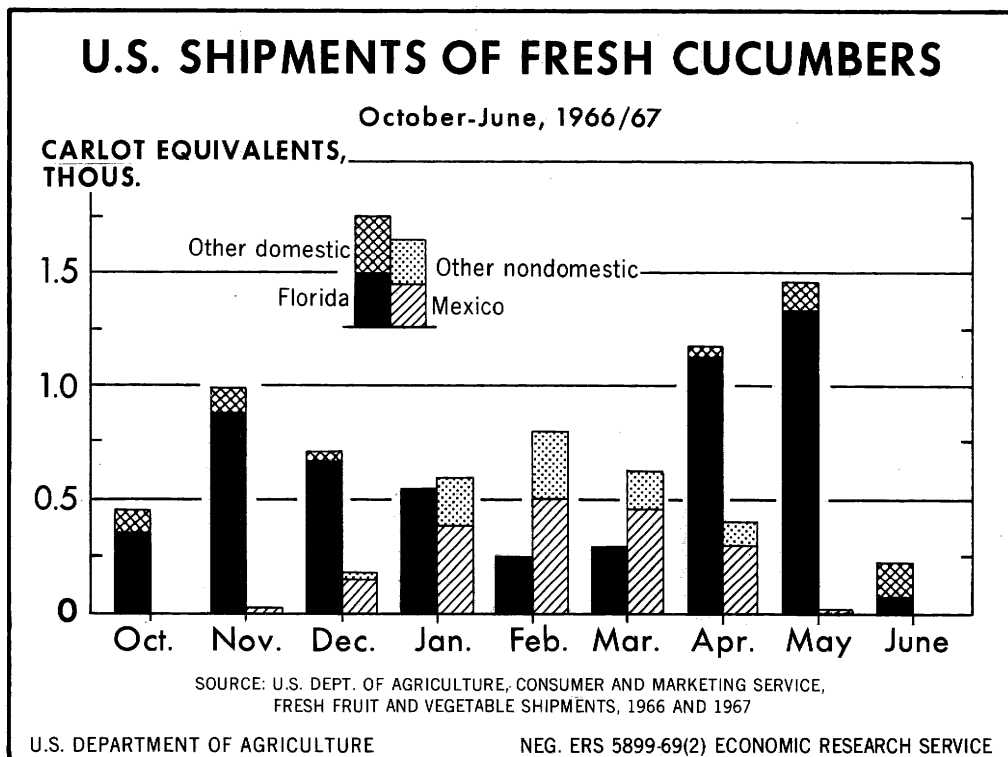


Figure 5

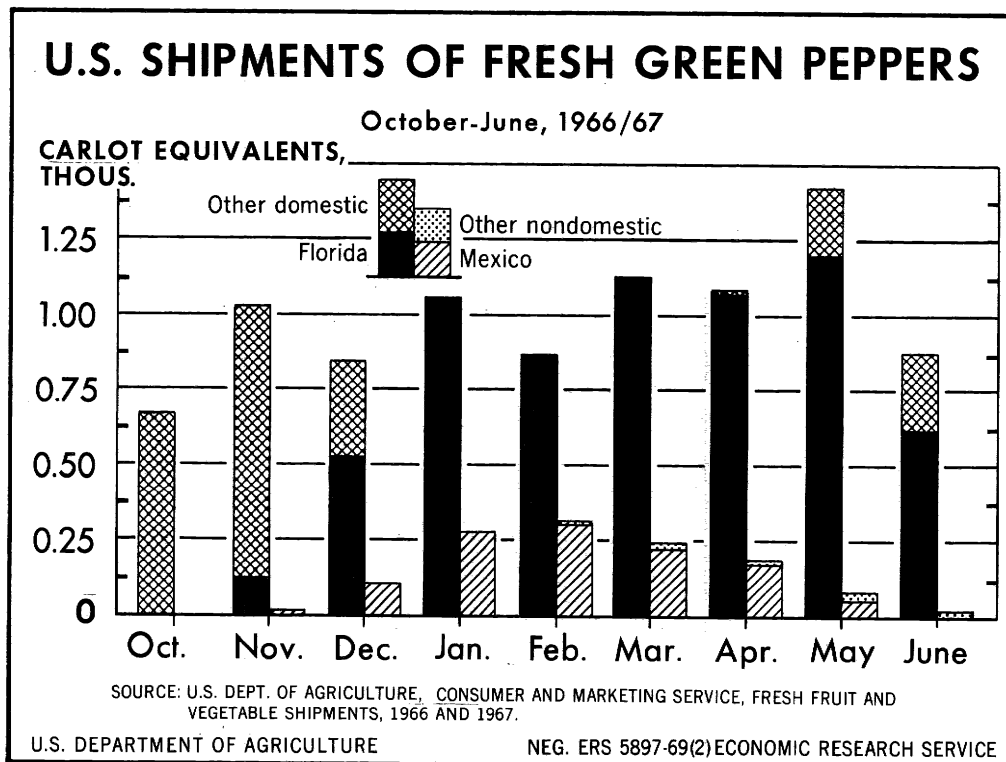
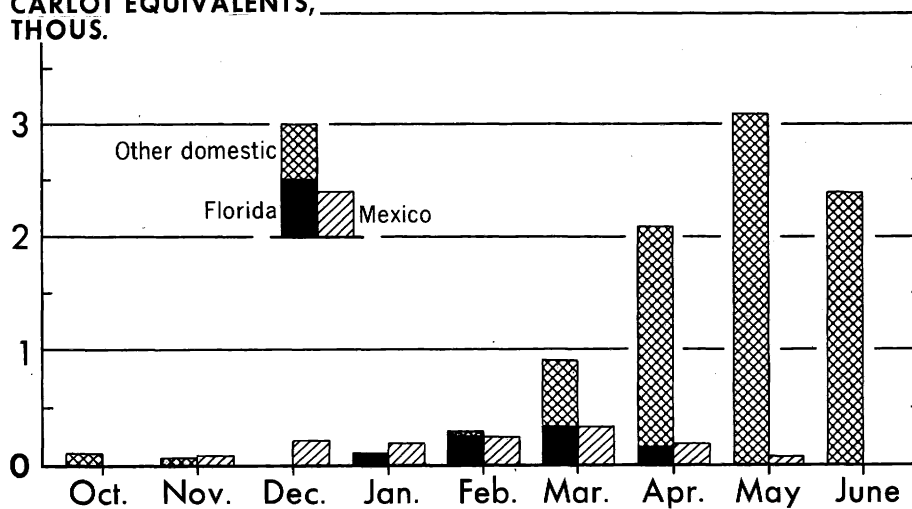


Figure 6

# U.S. SHIPMENTS OF FRESH STRAWBERRIES

October-June, 1966/67

CARLOT EQUIVALENTS,  
THOUS.



SOURCE: U.S. DEPT. OF AGRICULTURE, CONSUMER AND MARKETING SERVICE,  
FRESH FRUIT AND VEGETABLE SHIPMENTS, 1966 AND 1967.

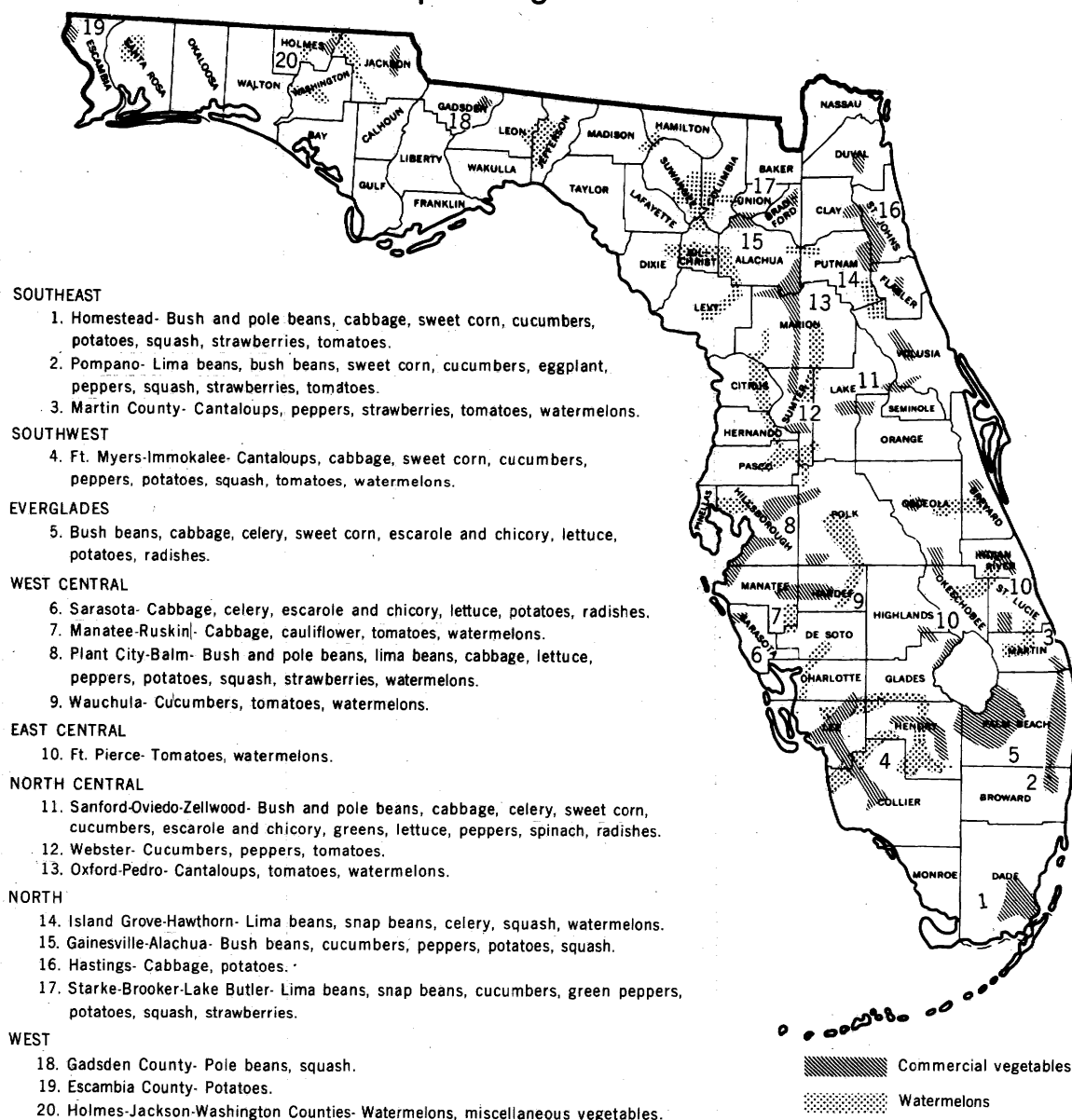
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5898-69(2) ECONOMIC RESEARCH SERVICE

Figure 7

# VEGETABLE PRODUCING AREAS IN FLORIDA

With Principal Vegetables Produced



Source: Florida Dept. of Agriculture, Florida Agricultural Statistics – Vegetable Summary 1967.

Figure 8

# IRRIGATED PRODUCTION AREAS, SINALOA, MEXICO

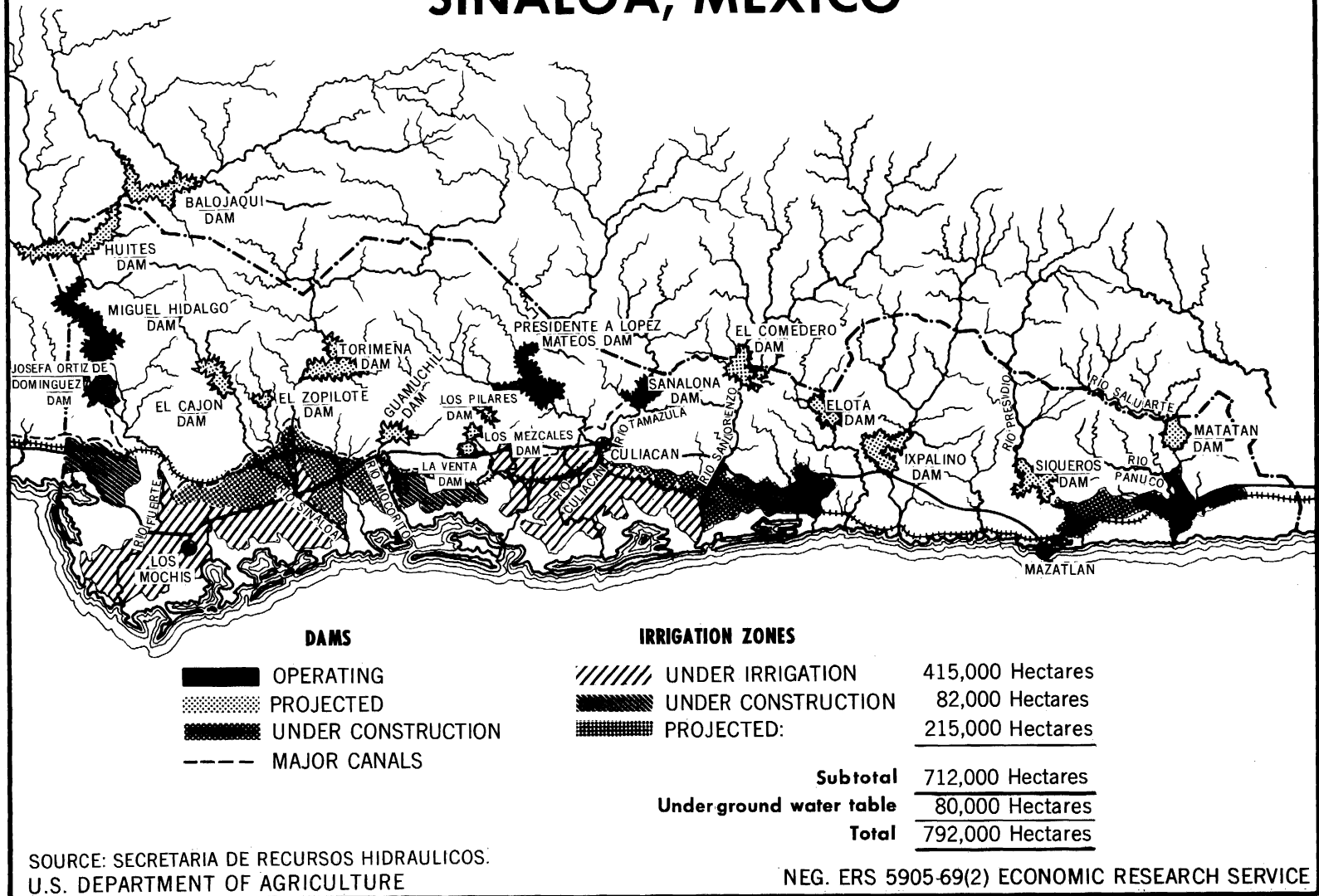


Figure 9



Figure 10

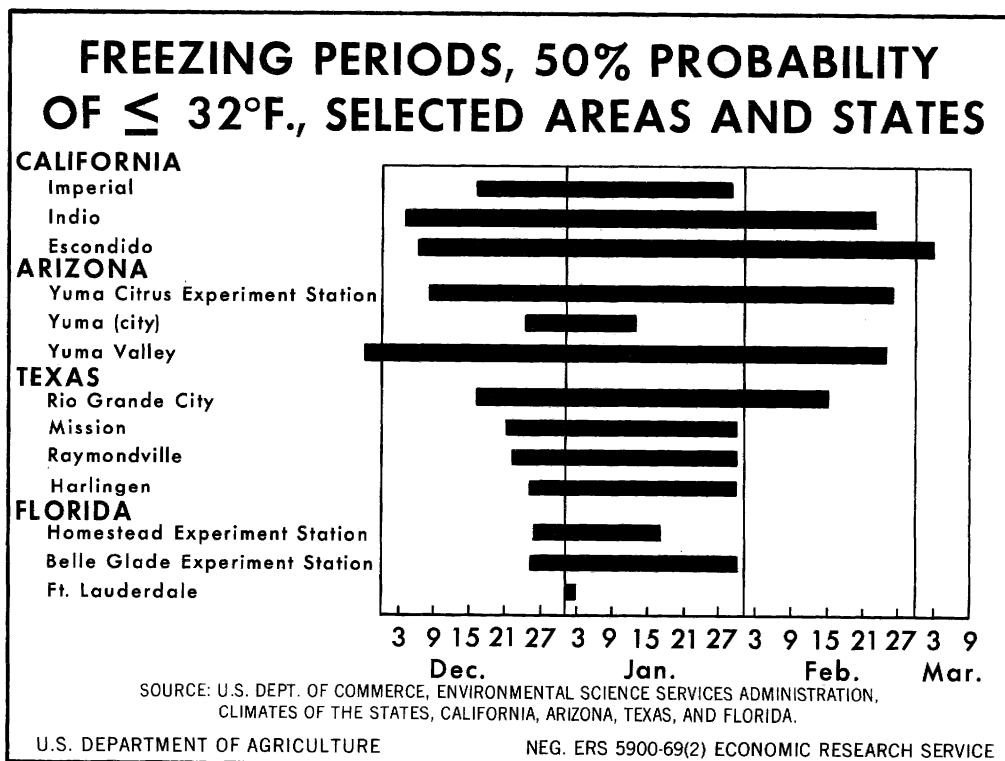


Figure 11

# 60-DAY TEMPERATURE HAZARDS

Percentage of Seasons That Temperatures of 36°, 32°, and 29°F. or Lower

Occured During 60-Day Periods

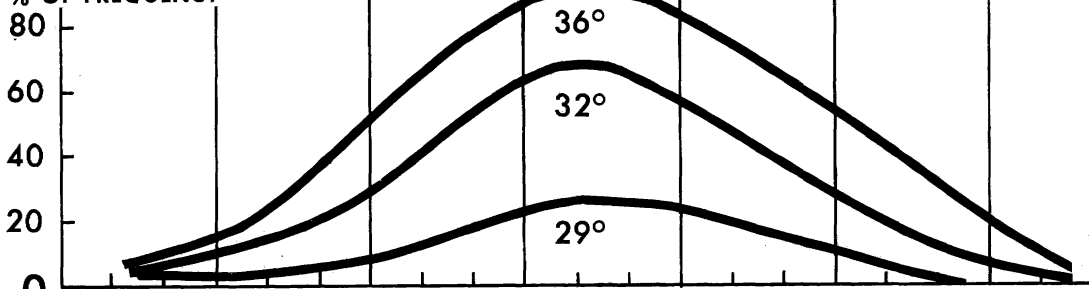
STATION 5638 HOMESTEAD

Lower East Coast

BEGINNING DATE OF 60-DAY PERIOD

SEPT. OCT. NOV. DEC. JAN. FEB. MAR.  
31 10 20 30 10 20 31 10 20 30 10 20 31 10 20 31 10 20 28 10 20

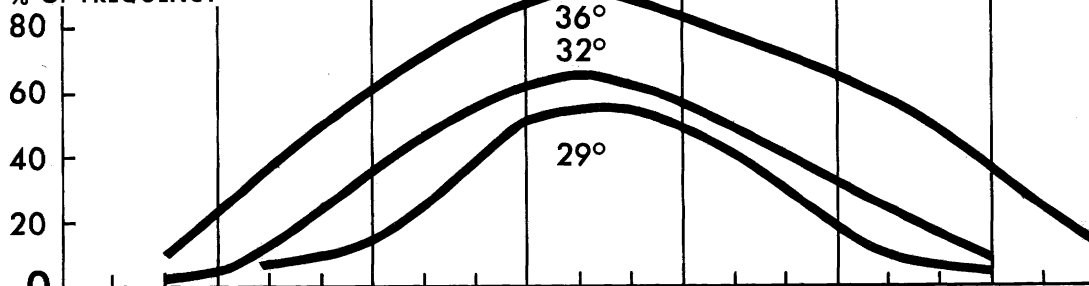
% OF FREQUENCY



STATION 4729T-B IMMOKALEE AREA

Everglades

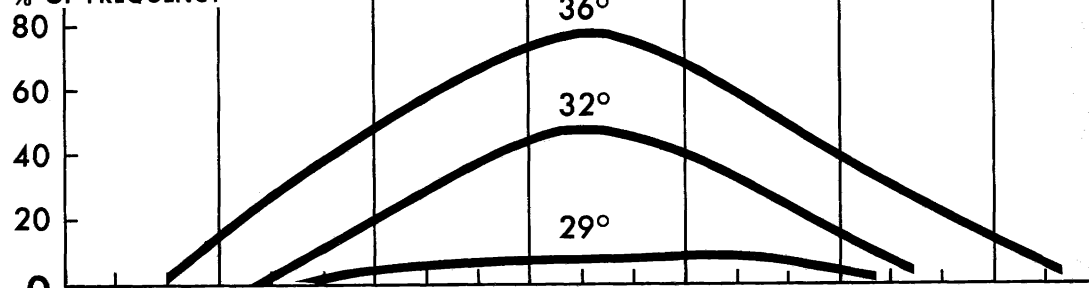
% OF FREQUENCY



STATION 4841-T-A POMPANO

Lower East Coast

% OF FREQUENCY



31 10 20 30 10 20 31 10 20 31 10 20 28 10 20 31 10 20 31 10 20  
NOV. DEC. JAN. FEB. MAR. APR. MAY

DATE AT END OF 60-DAY PERIOD

28 YEARS OF RECORD, 1937/38 TO 1964/65

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5908-69(2) ECONOMIC RESEARCH SERVICE

Figure 12

# MEAN DATE OF FIRST 32° F. TEMPERATURE IN AUTUMN

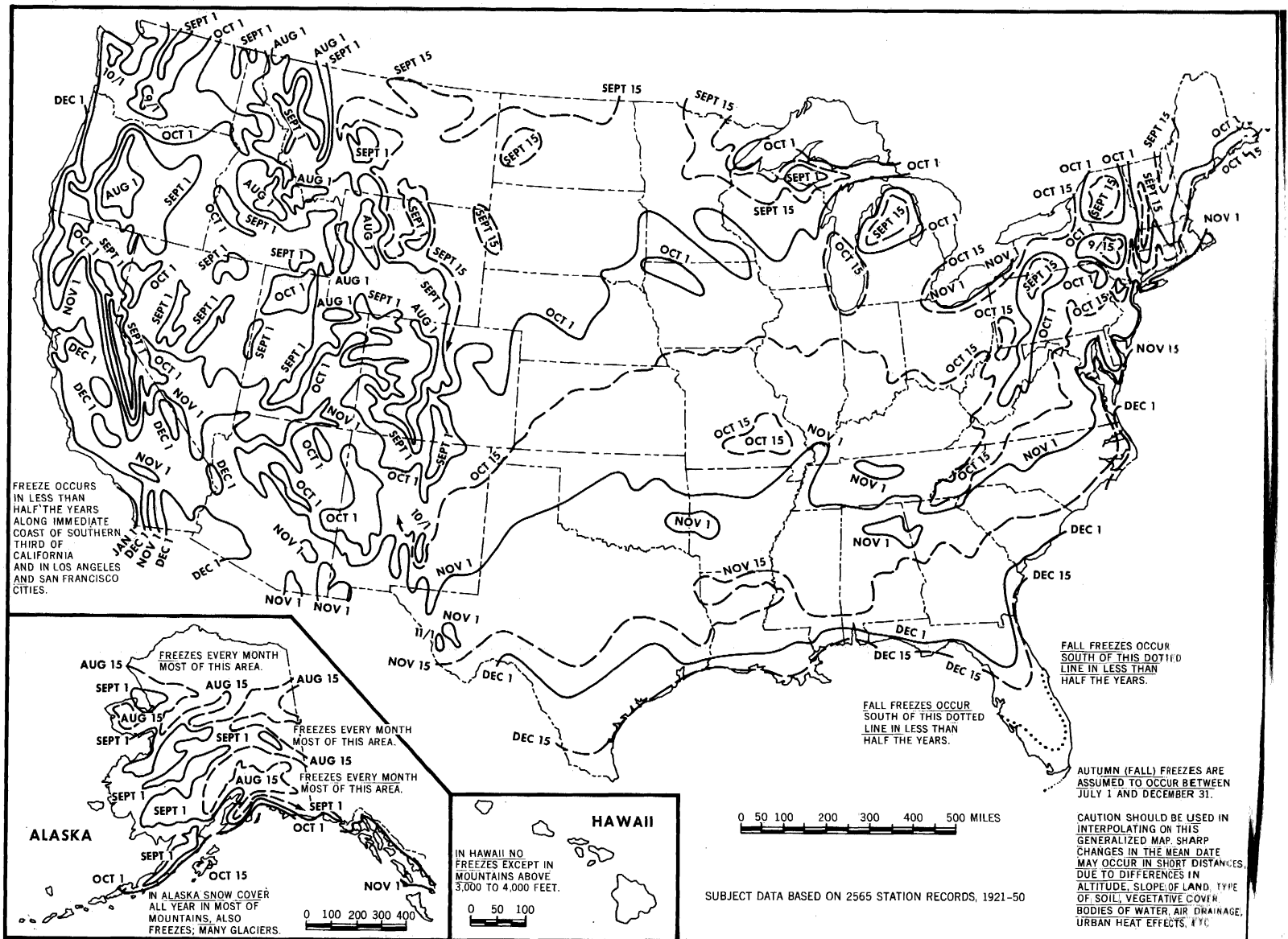
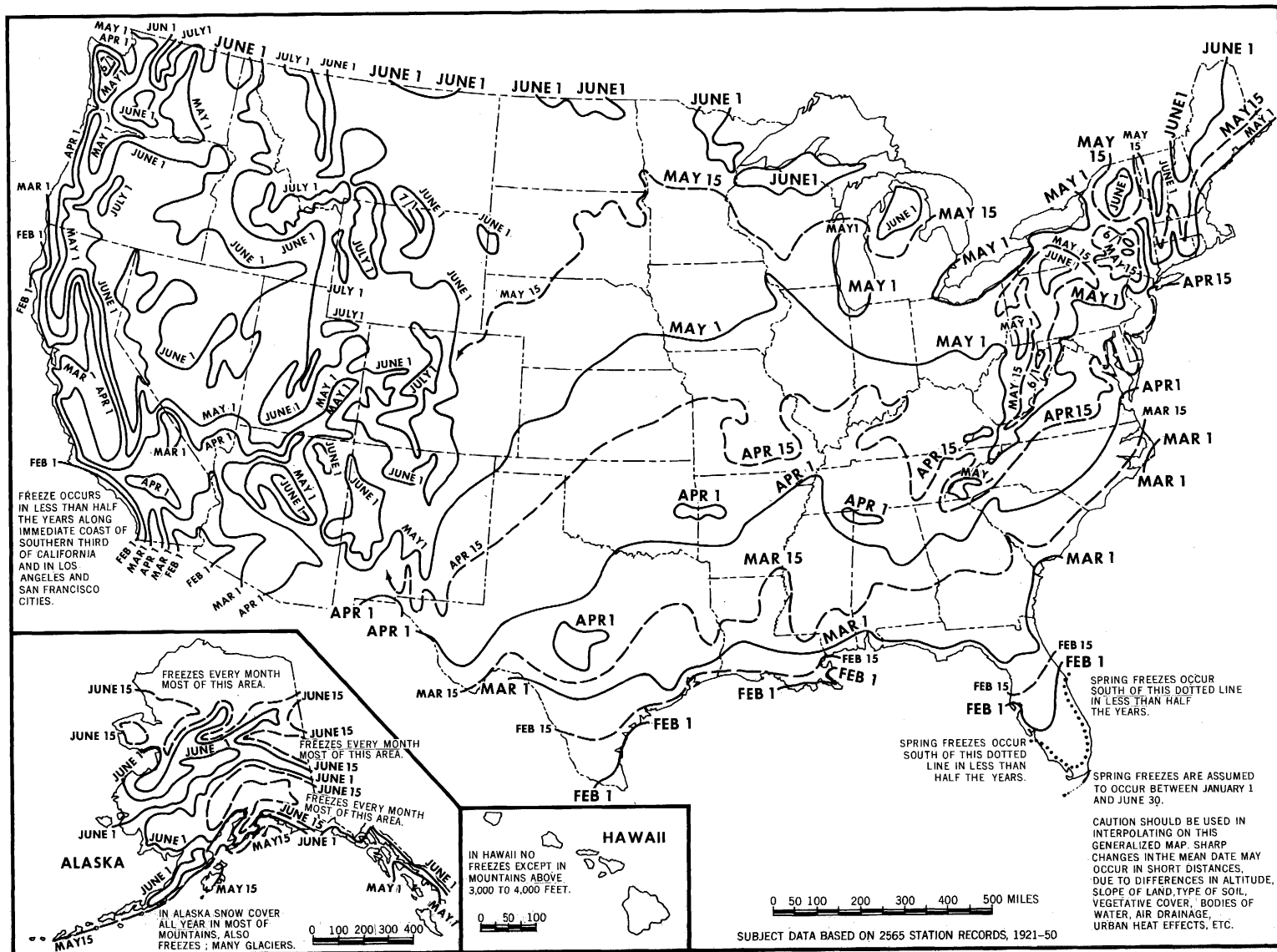


Figure 13

# MEAN DATE OF LAST 32° F. TEMPERATURE IN SPRING



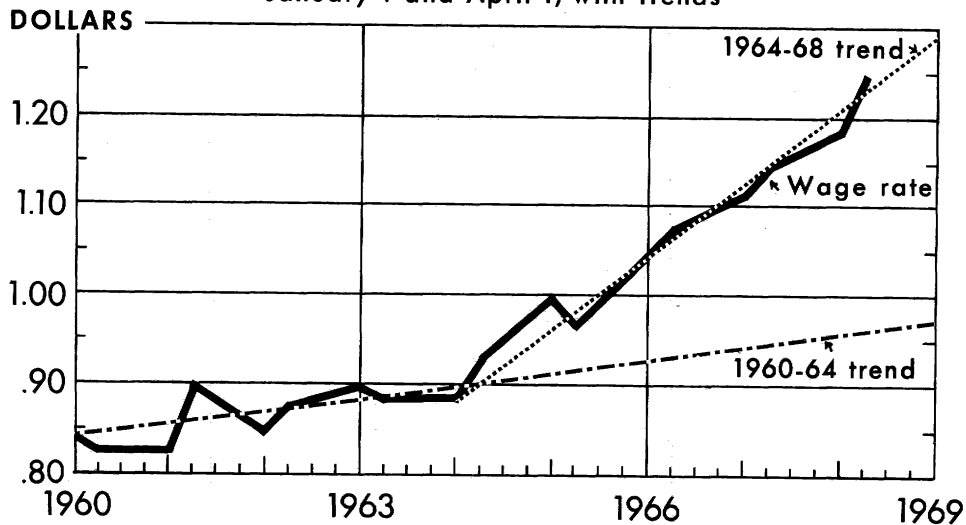
SOURCE: U.S. DEPARTMENT OF COMMERCE, ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5885-69(2) ECONOMIC RESEARCH SERVICE

Figure 14

# FLORIDA: CASH FARM WAGE RATE PER HOUR

January 1 and April 1, with Trends



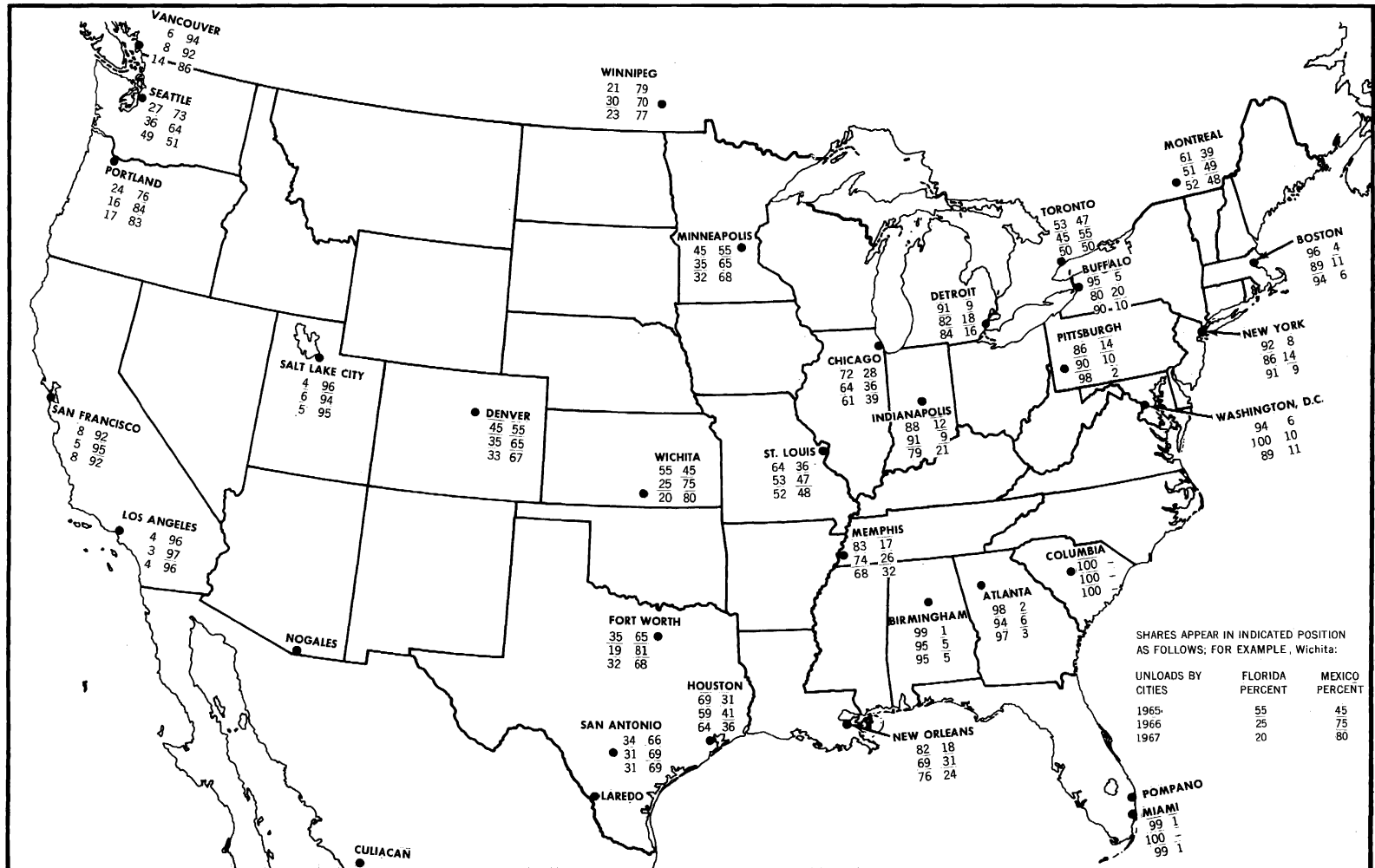
SOURCE: U.S. DEPT. OF AGRICULTURE, STATISTICAL REPORTING SERVICE, FARM LABOR, SELECTED ISSUES, 1961-68.

U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5909-69(2) ECONOMIC RESEARCH SERVICE

Figure 15

# RELATIVE SHARES OF FLORIDA AND MEXICO TOMATO SHIPMENTS TO SELECTED MARKETS, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3; 4, 5, AND 6, 1966 AND 1967.

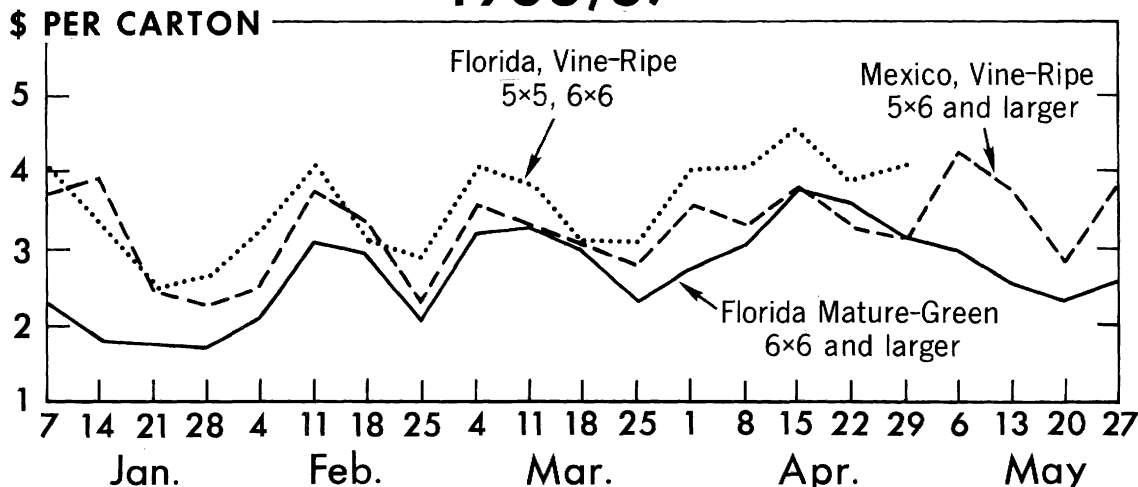
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5884-69(2) ECONOMIC RESEARCH SERVICES

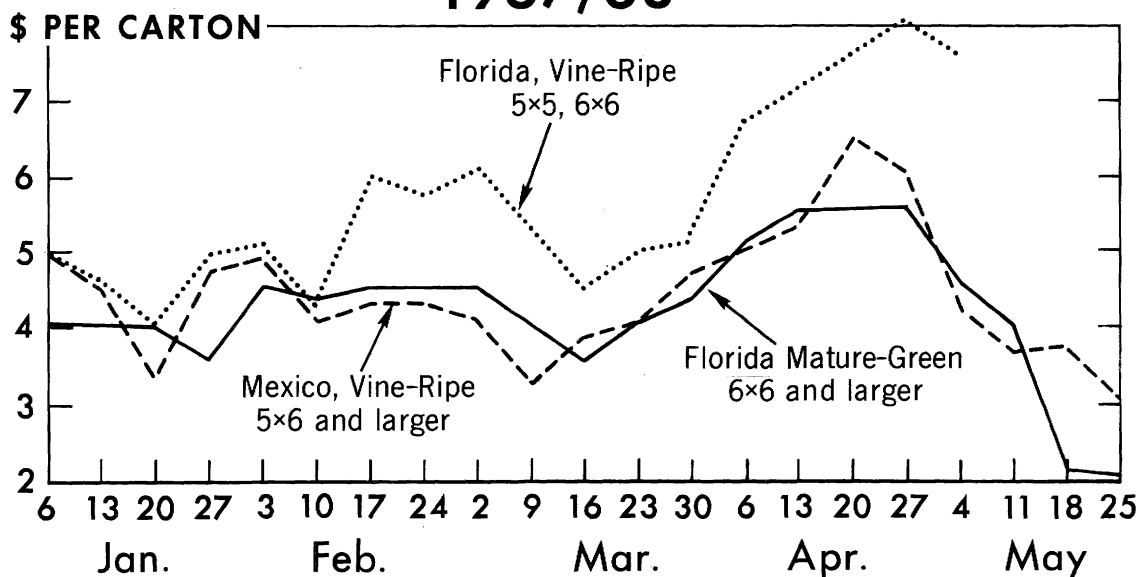
Figure 16

# WEEKLY PRICES FOR 20-POUND EQUIVALENT OF VINE-RIPE AND MATURE-GREEN TOMATOES\*

## 1966/67



## 1967/68

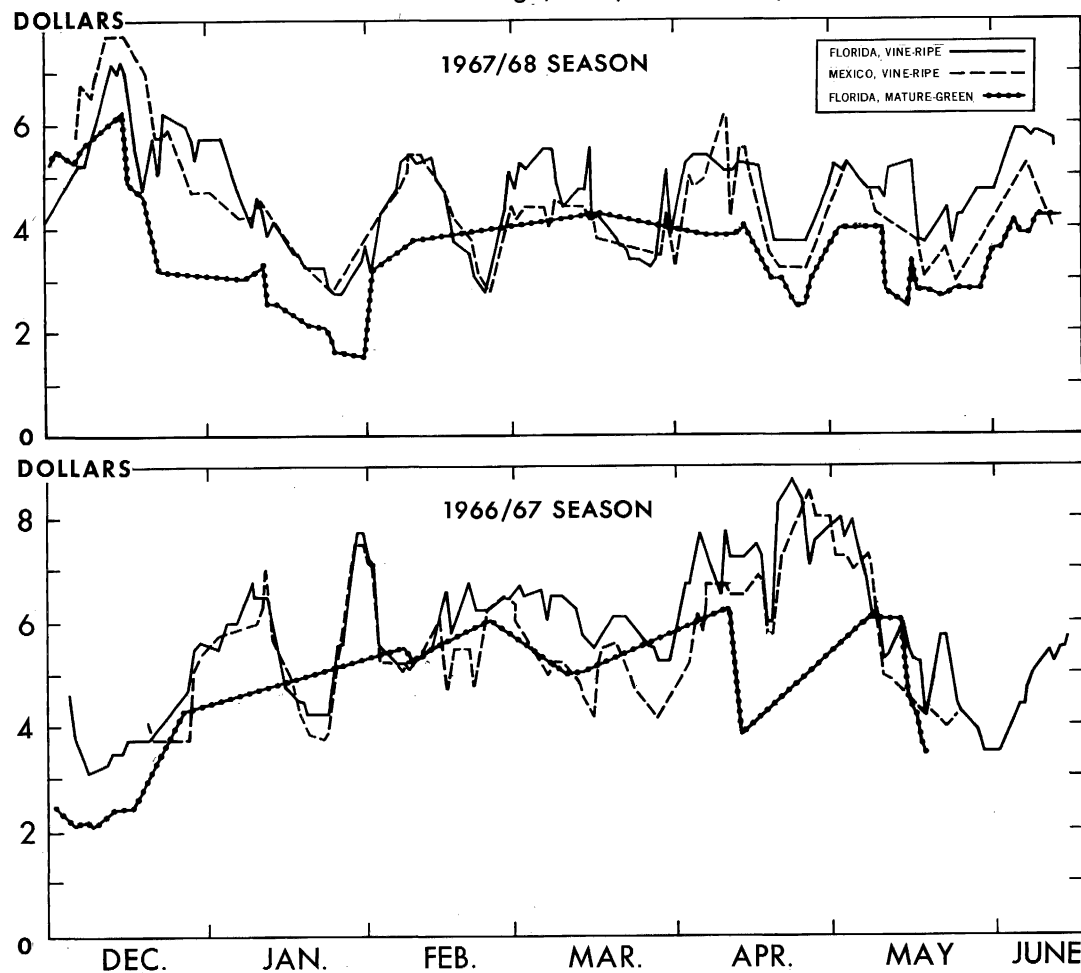


\* FOB NOGALES, ARIZONA, AND SOUTH FLORIDA SHIPPING POINTS.

Figure 17

# FLORIDA AND MEXICO VINE-RIPE AND MATURE-GREEN TOMATOES

Daily Market News Price Quotations  
20-Pound Containers in Chicago, 1966/67 and 1967/68 Seasons



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, MARKET NEWS REPORT.

SEE TABLE 69 FOR CORRESPONDENCE OF VARIOUS TOMATO SIZES TO PRICE QUOTATIONS.

Figure 18

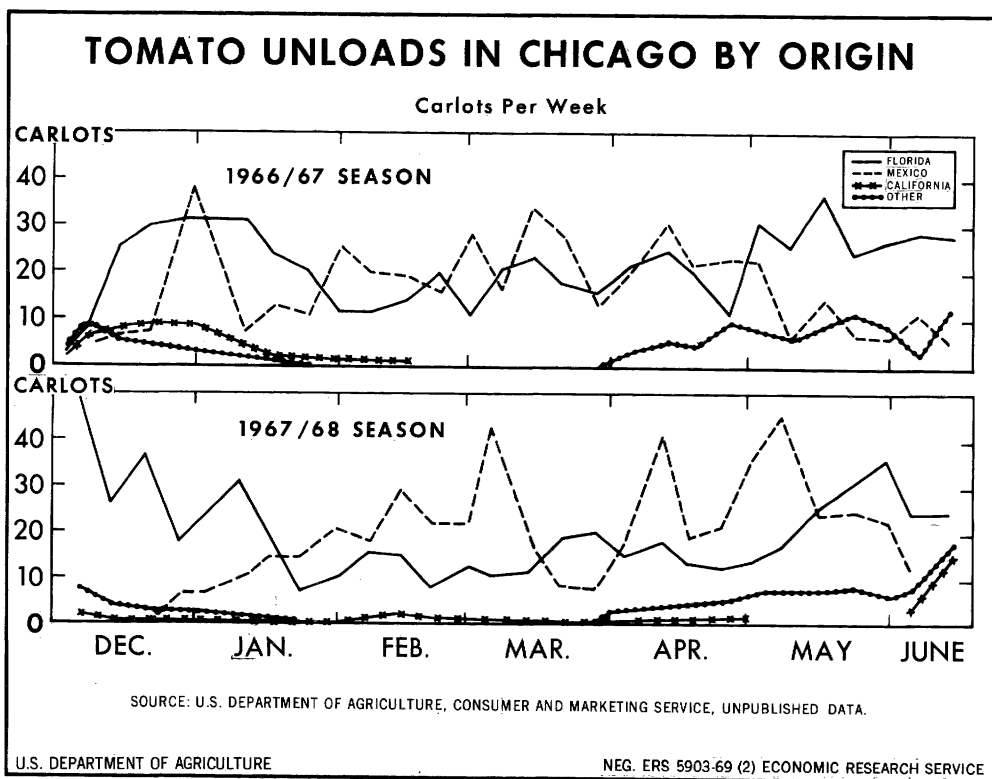


Figure 19

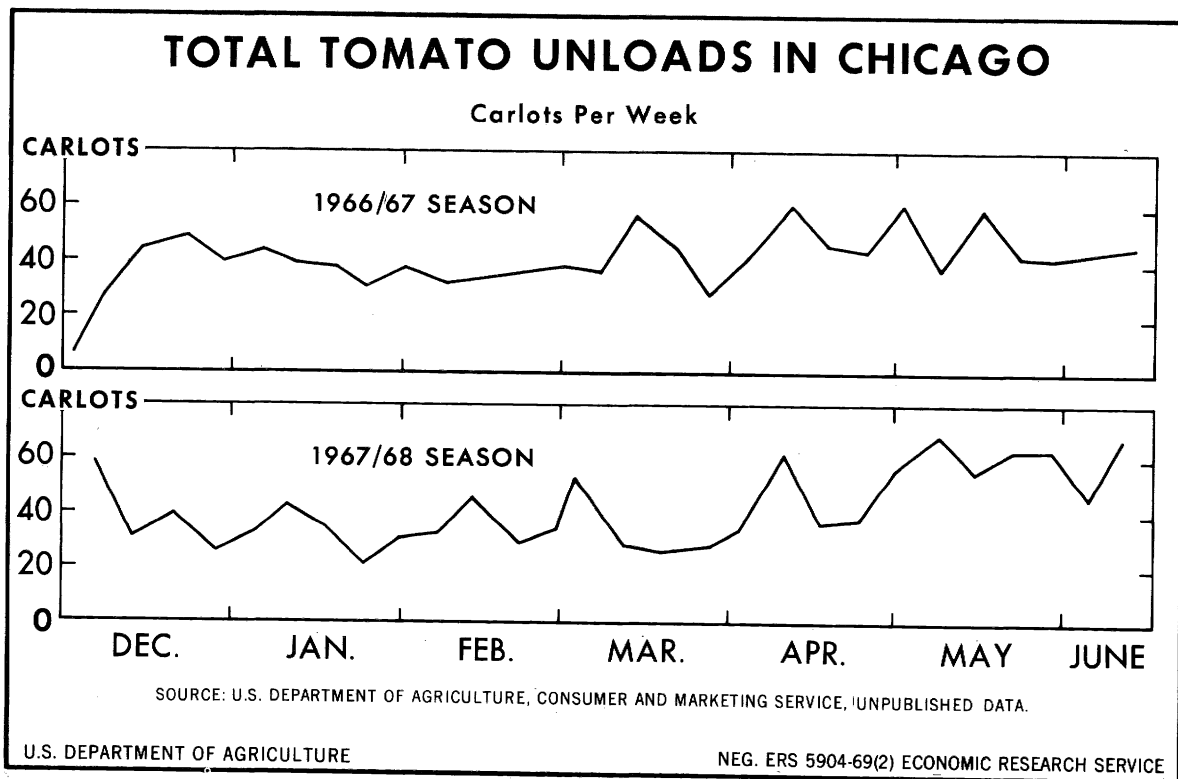
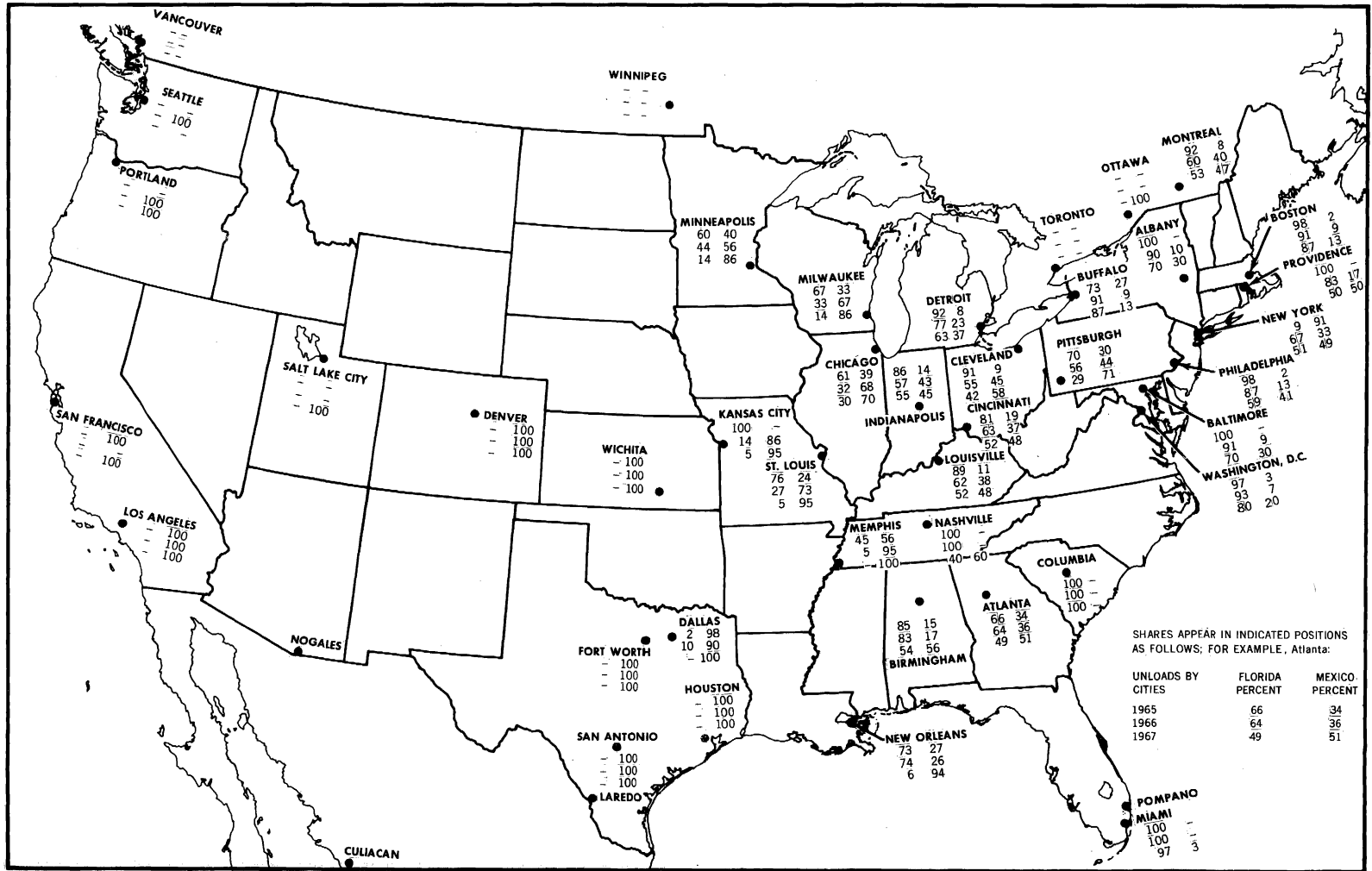


Figure 20

# RELATIVE SHARES OF FLORIDA AND MEXICO STRAWBERRY SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1965, 1966, AND 1967.

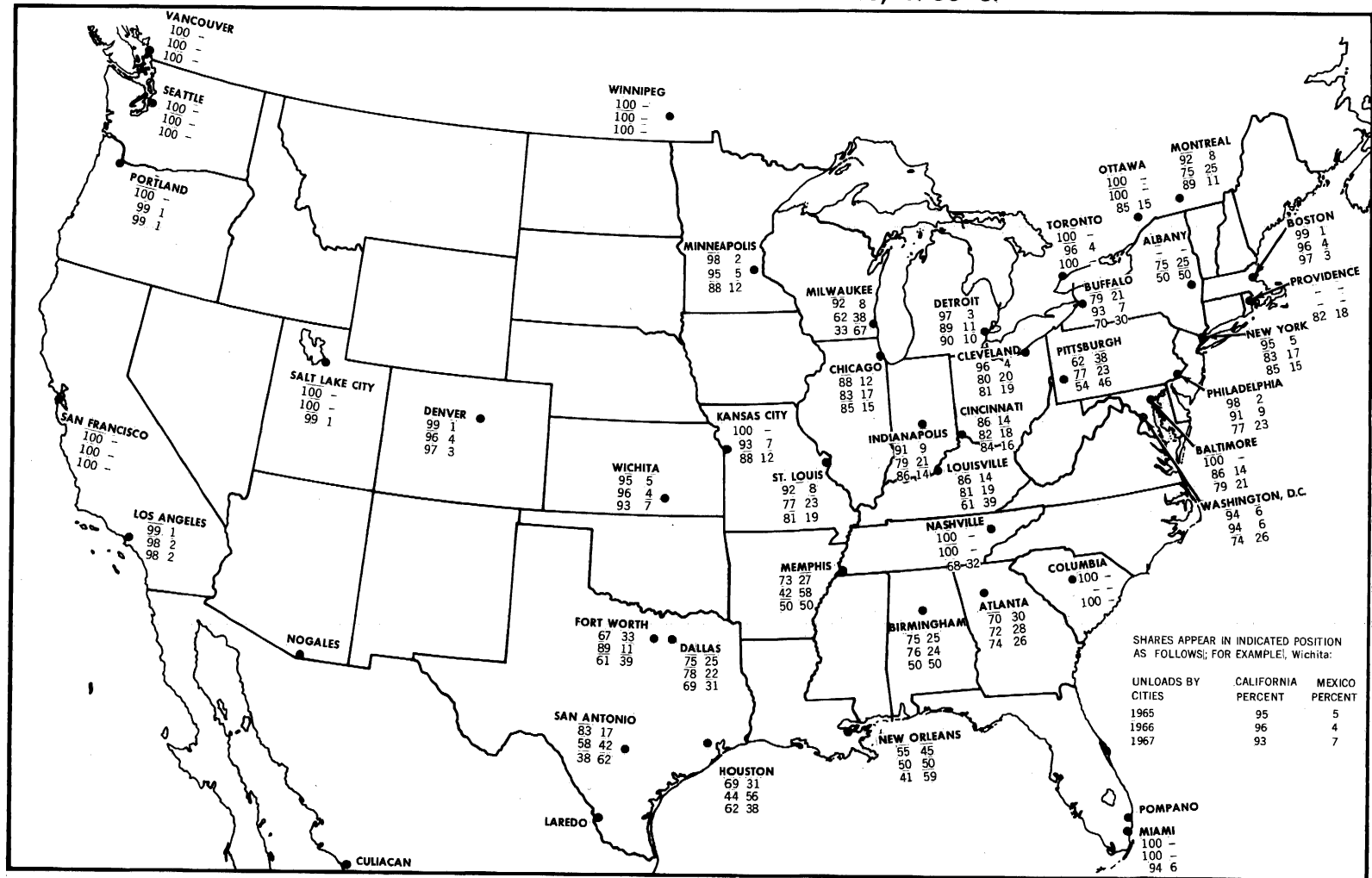
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5888-69(2) ECONOMIC RESEARCH SERVICE

Figure 21

# RELATIVE SHARES OF CALIFORNIA AND MEXICO STRAWBERRY SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



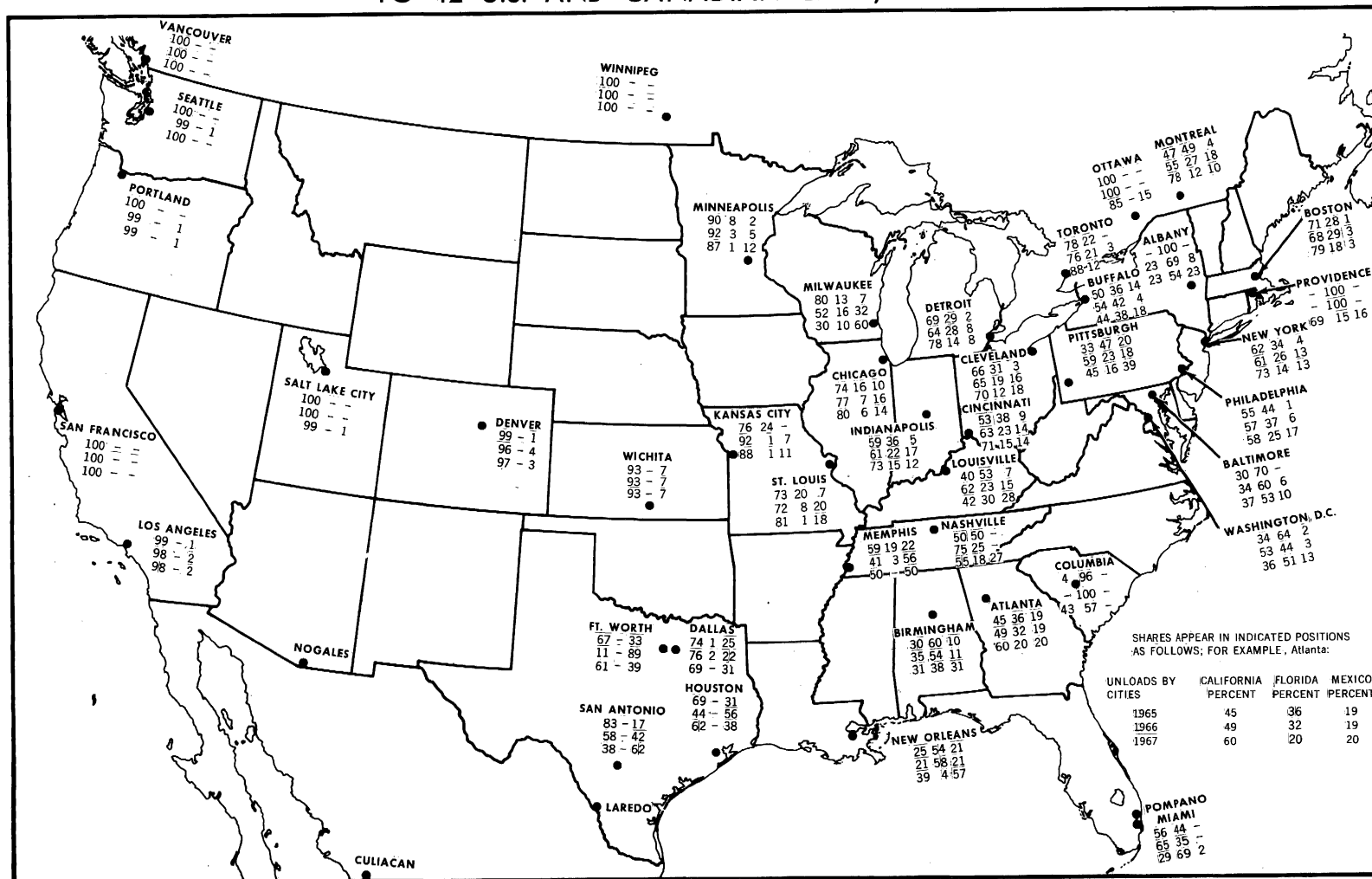
SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1966 AND 1967.  
U.S. DEPARTMENT OF AGRICULTURE

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Figure 22

# RELATIVE SHARES OF CALIFORNIA, FLORIDA, AND MEXICO STRAWBERRY SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1965, 1966, AND 1967.

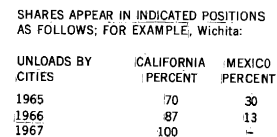
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5892-69(2) ECONOMIC RESEARCH SERVICE

Figure 23

TO 42 U.S. AND CANADIAN CITIES, 1965-67

TO 42 U.S. AND CANADIAN CITIES, 1965-67

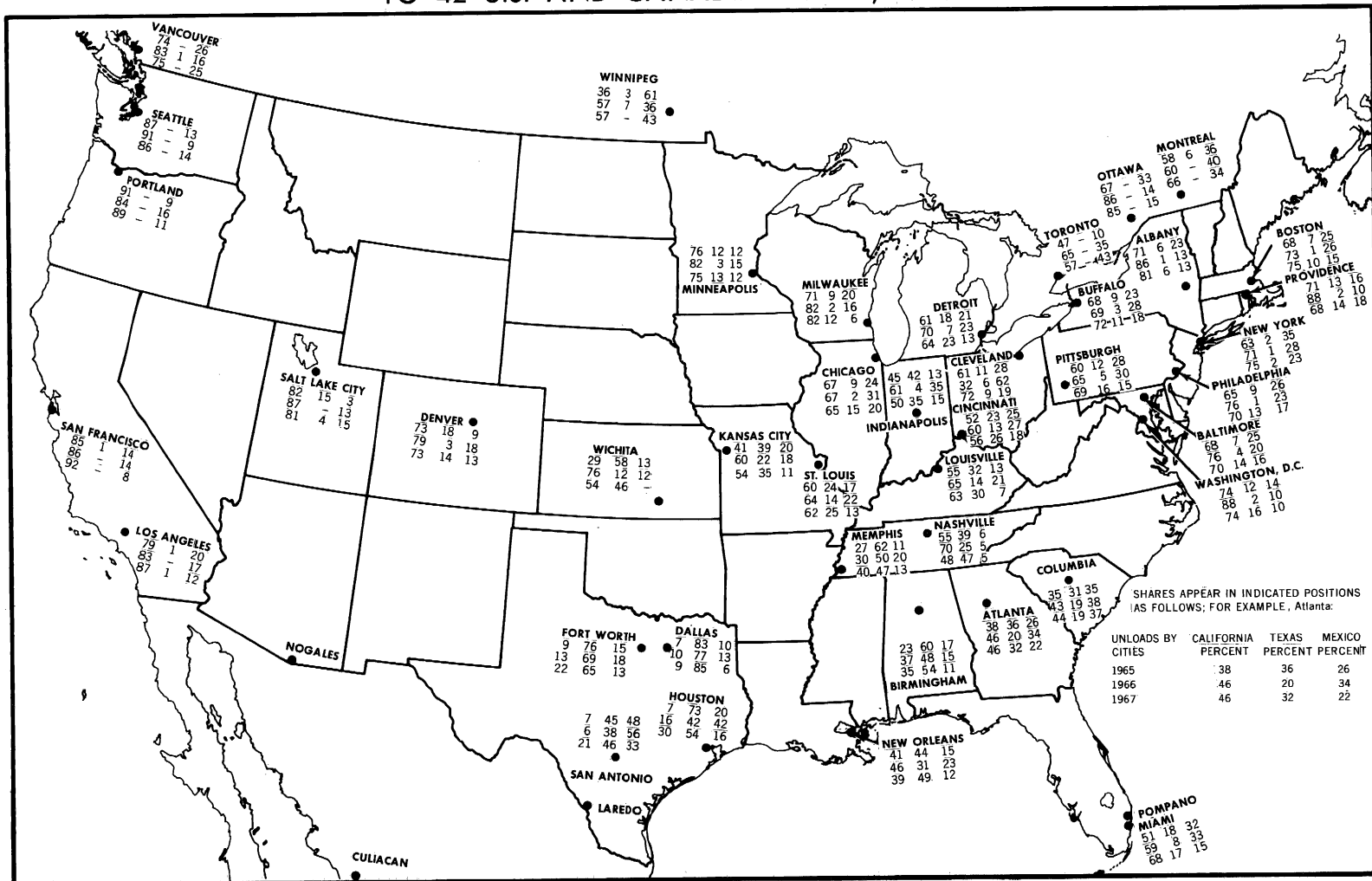


NEG. ERS 5887-69(2) ECONOMIC RESEARCH SERVICE

Figure 24

# RELATIVE SHARES OF CALIFORNIA, TEXAS, AND MEXICO CANTALOUPE SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



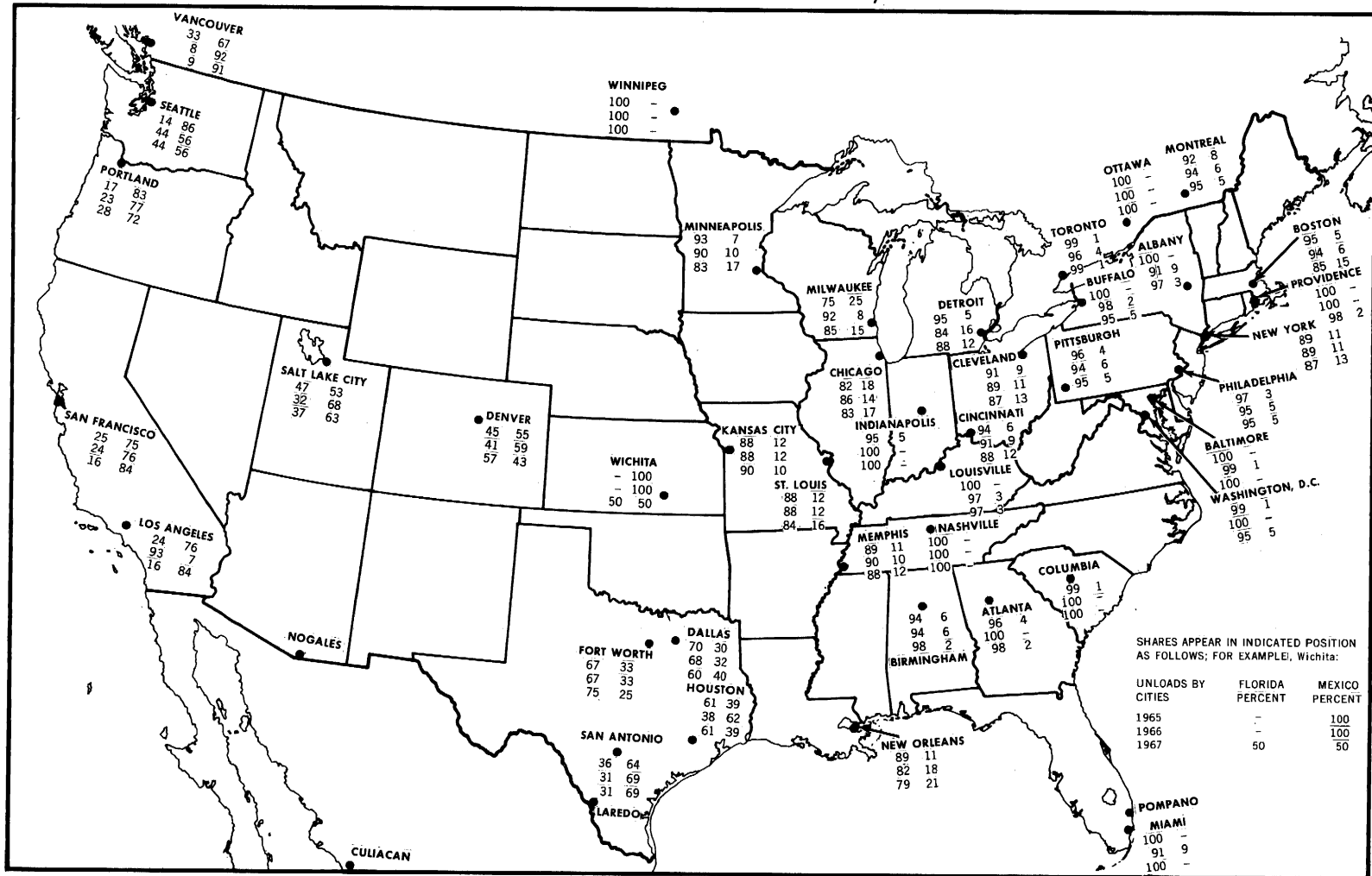
SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1965, 1966, AND 1967.  
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5893-69(2) ECONOMIC RESEARCH SERVICE

Figure 25

# RELATIVE SHARES OF FLORIDA AND MEXICO CUCUMBER SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3,4,5, AND 6, 1966 AND 1967.

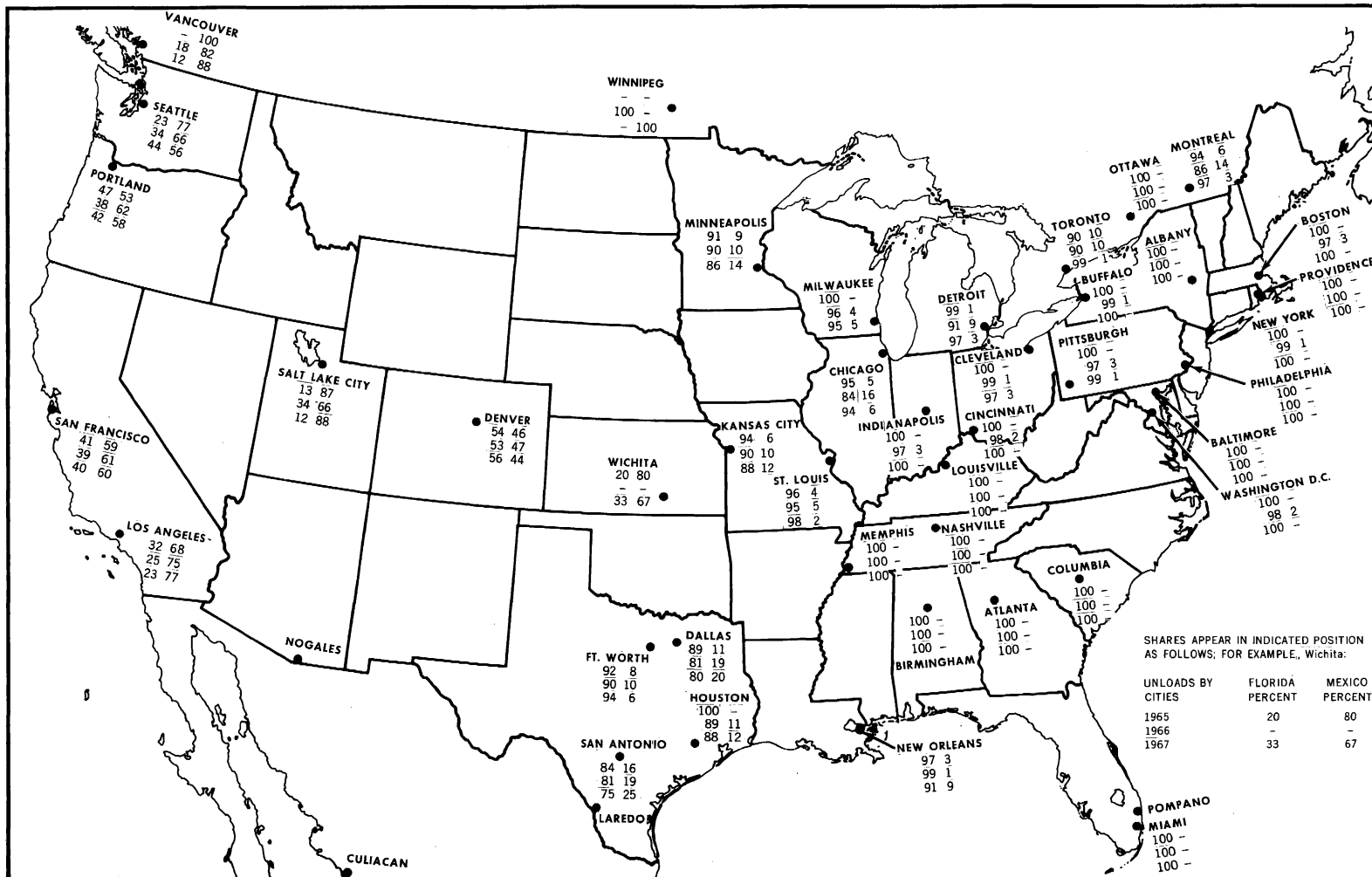
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5883-69(2) ECONOMIC RESEARCH SERVICE

Figure 26

# RELATIVE SHARES OF FLORIDA AND MEXICO PEPPER SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1966 AND 1967.

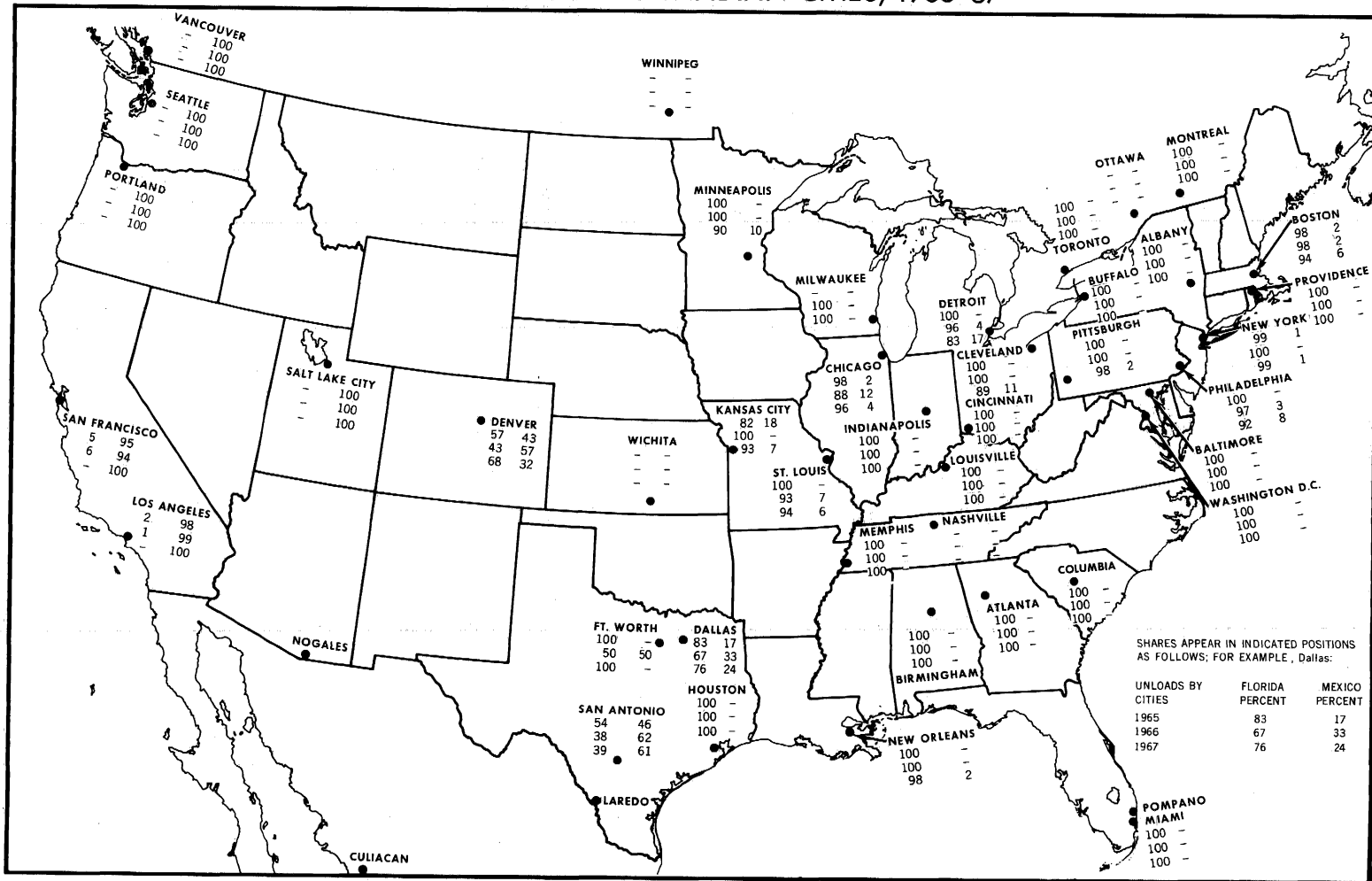
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5890-69(2) ECONOMIC RESEARCH SERVICE

Figure 27

# RELATIVE SHARES OF FLORIDA AND MEXICO EGGPLANT SHIPMENTS

TO 42 U.S. AND CANADIAN CITIES, 1965-67



SOURCE: U.S. DEPARTMENT OF AGRICULTURE, CONSUMER AND MARKETING SERVICE, FRESH FRUIT AND VEGETABLE UNLOADS, 3, 4, 5, AND 6, 1966 AND 1967.  
U.S. DEPARTMENT OF AGRICULTURE

NEG. ERS 5891-69(2) ECONOMIC RESEARCH SERVICE

Figure 28

## APPENDIX III

### Analysis of the Agricultural Situation of Sinaloa September-October 1967, No. 49

Translated by Patricia Taylor  
Farm Production Economics Division  
Economic Research Service

#### Introduction

Page 191

For the purpose of determining the acreage to be seeded to tomatoes for export, in the State of Sinaloa, during the 1967-68 season, the Confederation of Agricultural Associations of the State of Sinaloa elaborated a study, results of which are published in this bulletin. It is important reading for those who want to become more familiar with the complexities of marketing tomatoes from Sinaloa.

Page 231

Study determining the acreage to be seeded to tomatoes for export, for the State of Sinaloa, during the 1967-68 season.

#### I. Purposes of the Study

The State of Sinaloa, annually during the winter season, supplies an important portion of the fresh tomatoes consumed in the United States. The Sinaloa supply because of its size undoubtedly influences the determination of prices in the markets of a majority of States, the character of which is typically that of a market of free supply and oligopsonistic demand. On the other hand, the heavy expenses required by cultivation, harvesting, packing, shipping, transport and crossing of exported tomatoes make it necessary that the U. S. prices at least cover these expenses making it indispensable that the Sinaloan agriculturalists, as much as possible, manage to regulate their supply to avoid a decrease in price to or below cost. In other words, in the production and exportation of vegetables, because the producers of Sinaloa supply an important part of the winter market of the United States, there exist possibilities of influencing prices by regulating the supply in such a way that these permit a net income for the producers, eliminating a good part of the possibilities of loss deriving from an uncontrolled supply.

From the preceding, the object of this paper is to analyze the production of fresh tomatoes in the U. S., principally during winter; the importations of this product by the United States from Mexico; the past behavior of the Sinaloa supply and how the total supply has behaved; and the prices during the winter season in the U. S. market. With these elements, the relation that exists between the supply and the prices will be found in order to decide, based on this relation and with technical instruments of analysis, statistical and economic, what supply should be offered by Sinaloan farmers in the 1967-68 season and what prices, more or less, they can expect if they follow our recommendation.

## II. Production in the U. S.

The annual production of fresh tomatoes in the U. S. from 1952 to 1965 has oscillated between 825 and 960 thousand tons. In 1961, the U. S. reached the highest production in these 14 years, producing a volume of 959,678 tons, a figure which was reduced in the following 4 years. The tomatoes imported by the U. S., principally from Mexico, represent about 12% of its domestic production, in absolute numbers, principally from 1958-1965, from 100 to 121 thousand tons per year. On the other hand, its exports annually reached figures oscillating around 45 thousand tons annually.

With the foregoing information, estimates of consumption, (domestic production plus imports minus exports) considering increases in population in order to obtain per capita consumption, allow us to observe that from 1952 to 1965, there is a slight tendency toward decrease in consumption, which is corroborated by USDA figures that indicate that there is a general tendency toward decrease in consumption per capita of fresh vegetables.

As a summary of the analysis of the figures of table 1, we can conclude that the U. S. production of fresh tomatoes has remained almost stable for 14 years. U. S. imports have grown but its exports, however, show a slight tendency to stabilize, in such a way that affirms that the U. S. is a net importer of fresh tomatoes, with figures that signify a slight ascendent tendency.

## III. Production in Florida.

The largest volume of fresh tomato imports to the U. S. are made during the months of January through April, that is, during all of winter and the beginning of summer. So that, for this paper it is necessary to analyze carefully the behavior of Florida winter production, which together with that of Mexico is almost totally sufficient for the U. S. market in this period.

The principal observations that can be made about Florida winter production, in agreement with table 2, are the following:

(a) From 1952 to 1965 the Florida acreage of fresh tomatoes oscillated between 4,300 and 9,400 hectares. In 1957 it was 9,348 hectares, the maximum acreage registered in the 14 years of the period that we are analyzing; and although this hasn't been equalled since, there has been a small tendency toward growth beginning in 1961.

(b) The yield per hectare, since 1961, reached a sufficiently satisfactory level that has been sustained in the following years, oscillating between 18 and 23 tons per hectare.

(c) A careful analysis of the prices and the acreage permits us to advise that there is a close relation between the changes in acreage in function of those registered in the prices. In effect, comparing the area with the prices of the immediately preceding year, one notes that after a year of good prices, the area seeded by the producers of Florida increases and that after a year of low prices, Florida farmers decrease the area destined for fresh tomato production. This indicates that the farmers of the State of Florida are not organized and that they are only guided by gains made in the immediately preceding year.

## IV. U. S. Imports Proceeding from Mexico.

In table 3 are shown the imports of fresh tomatoes by the U. S. from Mexico. It appears clear that since 1958, Mexico has increased its influence.

## V. Total Supply.

In order to estimate the total supply of fresh tomatoes in the winter season, for the U. S. market, we have considered the winter production of Florida plus the total of importations from Mexico, understanding that these are mostly made during winter. Therefore, we consider that the supply figures we have obtained closely approximate the actual figures.

Aiming to eliminate increases in consumption through population growth, in chart 4, figures were determined using actual population figures and related to actual prices for the same period. Beginning with the assumption that changes in supply affect actual prices, based on usage applied by economists to similar problems, calculations were made for tables 5, 6 and 7, which permitted us to obtain a formula for determining the prices corresponding to various supplies, in function of the changes in the latter. This formula does not include the variables that influence the movements of demand and, therefore, the calculated figures could differ from the actual ones, fundamentally through changes not considered that have to do with demand; such as: temperatures, revenue, prices of close substitute products, etc.

## VI. Relation Between Supply and Prices.

The formula obtained indicates to us that there exists an inverse relation between variations in levels of supply and those of prices, expressed in the following formula:  $Y = 0.887 X^{-0.4031}$

Also the confidence limits of the estimates based on this formula were mathematically calculated (table 8). Actually, there exists a 95% probability that the real prices will be up to 25.2% above or 20.1% below those calculated with the formula.

To better estimate the advantages and possible failures leading from the applied techniques, we calculated, with the formula derived in table 9, the levels of prices that during the 15 years studied, theoretically should have appeared in the market and compared these with the actual prices. Of the 15 years, in 95% or 14 years the calculated prices were within the estimated limits of confidence, that is the real prices were never smaller than 79.9% nor greater than 125.2% of those calculated and only in one year (that is in 5% of the cases), in 1957 which was totally abnormal, they resulted 22.3% smaller than those calculated.

Moreover, averaging the percentage differences between the calculated prices and those in the market during the 15 years of study, it was estimated that for seven years the actual prices averaged 10.7% above those calculated, and for eight years they averaged 9.3% below. For the 15 years the prices calculated differed on the average by 10% from the actual prices.

## VII. Estimate for the 1967-68 Season.

Based on the formula, in agreement with the tendencies in the normal per capita supply, and with the tendencies in normal prices, it was estimated that the total supply for 1967-68 could equal 300,000 tons, and that in case the producers adjust themselves to it, they can expect that the price will behave as follows: To be equivalent in total production to an average of \$3.00 per box of three layers with possible fluctuations between \$2.40 and \$3.75.

We ought to make clear that the price resulting from rigorous application of the formula is increased by the amount of U. S. customs duties, because the figures that we have used are border prices (L.A.B.).

We consider that the estimate of 300,000 tons total supply in 1967-68 for winter consumption in the U. S. market, including the production of Florida and the exports of Mexico, should be distributed in the following manner:

Florida.....	165,000 tons
Mexico.....	<u>135,000 tons</u>
Total.....	300,000 tons

The figure corresponding to Mexico should be increased by an exportation to Canada (see table 10) of 30,000 tons yielding a total that we estimate at 165,000 tons.

The total Mexican exports should be distributed, in agreement with the data of table 11, in the following form:

Sinaloa.....	150,000 tons
Sonora and others.	15,000 tons

#### VIII. Considerations.

To back the estimates that we have made, it is necessary to make the following considerations:

(a) With respect to the possible Florida supply of 165,000 tons.

1. The calculation is based on a projection made from the data on Florida winter production from 1951 to 1965, this data appears in table 12.

2. From 1961 to 1965, Florida has noticeably increased its winter production, thanks mostly to important increases in yield, since there has been little variation in acreage from one year to the next.

3. Considering an average yield similar to that from 1961 to 1965, that is, around 20 tons per hectare, Florida would have to use 8,000 hectares to produce the 165,000 tons that we estimate. This would signify a 16% increase over the average acreage from 1962-1965, but only 5% over that of 1965.

4. It appears that there are no limits on the possibility that Florida might plant 8 thousand or more hectares in the 1967-68 season, because it planted 9,348 hectares in 1957.

5. Analyzing the sequence followed by the acreage in function of fluctuations in price, the 1967-68 season should show a reduction in acreage relative to that of the preceding year, 1966-67. Nevertheless, the prices were slightly higher in 1966-67 than in 1965-66, from which it is possible to expect that the acreage would be more or less the same in 1967-68 as 1966-67.

6. For these reasons, we conclude that Florida may bring 165,000 tons to the market, but it appears more probable that it will only bring around 150,000 tons.

(b) With respect to Mexico needing to contribute 165,000 tons. In this aspect there exists no production limitation preventing Mexico's supplying this volume. In reality Sinaloa alone could complement the production of Florida to supply all the U. S. winter market in the magnitude that we have calculated for 1967-68 plus 30,000 tons for Canada.

(c) With respect to Sinaloa needing to contribute 150,000 tons.

1. In this case it is a matter of limiting the production for export of Sinaloa, in such a way that added to possible Florida supply and that of the other Mexican exporting zones, the total volume won't exceed the supply that it is estimated should arrive in the U. S. market, in order that the average prices will oscillate between \$2.40 and \$3.75 for a box of three layers or the equivalent.

2. Because the greatest area is seeded in the valley of Culiacan, we consider it useful to base our figures on the average yields of this zone, to estimate the area necessary so that Sinaloa could export around 150,000 tons. Since the average yield in the last two years was 17 tons per hectare, the area to be seeded could be 8,800 hectares of staked tomatoes or its equivalent in a ground crop. However, to consider a yield of 17 tons per hectare is to admit that a large part of the producers are operating on a point of equilibrium between income and expenses. Thus it is indispensable that the producers raise these yields, so that they can persist in these activities.

3. Following table 13 which indicates the behavior of yields in the valley of Culiacan in the 1966-67 season, in stake seedings, it's not unlikely to think of an increase in average yield for the next season. In other words, it is possible to arrive at an average yield of 20 tons per hectare, principally considering that there will be no border limits for sizes. In this way, with the area of 8,800 hectares, Sinaloa could arrive at exporting up to 176,000 tons, which would compensate with increase anything that Florida does not accomplish of its assigned production of 165,000 tons, and could even decrease the prices with respect to the level we have calculated.

(d) With respect to the total supply of 300,000 tons to the United States and 300,000 tons to Canada.

1. Although our calculations are based on a rigorous projection of the behavior of Florida production and Mexican exports during fifteen years, it is necessary to note that consumption increased in the years from 1964-67 in a very important manner. In table 14 it can be estimated that the period of prosperity in the U. S. economy, begun in 1961, reached its high point after 1964, which can be verified by examining figures on personal available income.

2. On the other hand, the preceding situation is plainly reflected in the consumer price index of the U. S., where also it can be clearly estimated that the most important increases are those of the years 1964 and 1965.

3. There is, however, the danger that a decrease in the growth rate of the U. S. economy would abruptly stop the strong increases in consumption registered during 1961-1967.

4. In summary, we consider that the figure of 300,000 tons of total supply for U. S. winter consumption and of 30,000 tons for Canada very possibly can meet the demand at the price level we have indicated. But, on the other hand, these figures shouldn't be considered conservative, rather they are sufficiently realistic or, in the last extreme, optimistic.

#### IX. Concrete Recommendations.

1. In the State of Sinaloa, there should not be seeded an acreage greater than 8,800 hectares of stake tomatoes or the equivalent in ground tomatoes.

2. From this total acreage, and based on the last two seasons, the distribution by agricultural zone should be:

Culiacan Valley, 7,200 hectares of stake or its equivalent of ground.

Fuerte Valley, 1,500 hectares of stake or its equivalent of ground.

3. Culiacan Valley should be considered as comprised of the zone of San Lorenzo and Pericos Valley. In the Fuerte Valley the zone of influence of the associations of Los Mochis and Guasave are considered.

4. As for the cherry tomato, only based on the experience of the last two seasons, we consider that only between 400 and 450 hectares should be seeded.

#### APPENDIX IV

##### Regulation for the Packing, Shipping, Crossing, and Sale of Tomatoes, 1966/67 Season.

(Approved in the General Assembly of Vegetable Growers of the Confederation of Agricultural Associations of the State of Sinaloa.) From Boletín Agrícola Año, No. 5, Sept.-Oct. 1966.

Translated by Patricia Taylor  
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Art. 1. This Regulation, starting with the present season, will govern the packing, shipping and crossing of exported tomatoes and the packing and sale of tomatoes for national consumption until it should be revoked. Its application should be of a national character and therefore it will be requested that the National Union of Horticultural Producers take the necessary action to make it apply on all borders through which tomatoes are exported to the United States, no matter in which State they were produced.

Art. 2. For the necessary convenience in applying the shipping restrictions, penalties, resumption of crossings, etc., mentioned in this Regulation, a Control Commission for Tomato Shipping and Crossing will be formed, composed of three members with residence in Nogales, Sonora.

Art. 3. The members of the mentioned Commission will be designated; one by the Association of Vegetable Distributors of Northeast Mexico, another will be named in the Specialized Council of Vegetable Growers of the Confederation of Agricultural Associations of the State of Sinaloa, and the third, designated directly by the National Union of Horticultural Producers, will invariably be the permanent representative of the said organization in Nogales, Sonora.

Art. 4. The representative of the Association of Vegetable Distributors of Northeast Mexico and the representative designated by CAADES will decide shipping restrictions, penalties, resumption of crossings, etc. by mutual accord. Only in the case of a difference of opinion will the representative of the National Union of Horticultural Producers make the decision.

Art. 5. The minimum bases for the packing, shipping and crossing of export tomatoes are: 80% inspection for green tomatoes and 75% for ripe or pink tomatoes.

Art. 6. Each decision concerning restriction or total suspension made by the Control Commission for Tomato Shipping and Crossing will go in force 72 hours following its determination and should be communicated immediately by telephone and telegraph to the agricultural organizations of the States of Sinaloa and Sonora and to the National Union of Horticultural Producers. Also, they should draw up and execute a certificate, signed by the three members of the Commission, in which is included the elements taken into consideration in making the decision.

Art. 7. To apply the packing, shipping and crossing restrictions, the Commission will take into account two elements: the minimum prices commanded in the market and daily arrivals of boxes in Nogales, Sonora. No restriction can be revoked before being in force three days.

#### "Pink Tomatoes"

Art. 8. The minimum prices considered are: \$2.50 (U. S.) F.O.B. Nogales, Arizona, for boxes of 3 layers and \$2.25 (U. S.) F.O.B. Nogales, Arizona, for boxes of 2 layers except the 6X6 size to which the minimum sales price for 3-layer boxes should apply, that is \$2.50 (U. S.) F.O.B. Nogales, Arizona.

Art. 9. With reference to daily arrivals of boxes, the bases for restrictions will be the following:

(a) During the month of January the limit for boxes arriving in Nogales will be 45,000 daily, and upon exceeding this figure for 3 consecutive days the "First Restriction" will go in force, and if the figure of 60,000 boxes arriving daily is exceeded for three consecutive days, the "Second Restriction" will automatically go in force.

(b) In the month of February upon exceeding for 3 consecutive days the figure of 65,000 boxes arriving daily the "First Restriction" will be applied, and upon exceeding for 3 consecutive days the figure of 80,000 boxes arriving daily the "Second Restriction" will be applied.

(c) During the months of March and April, upon exceeding for 3 consecutive days the figure of 85,000 boxes arriving daily the "First Restriction" will be applied, and when for 3 consecutive days the figure of 100,000 boxes arriving daily is exceeded, the "Second Restriction" will be applied.

(d) From the first of May to the end of the season, the arrival on three consecutive days of more than 65,000 boxes of pink tomatoes daily will be a reason for the application of the "First Restriction," and if during three consecutive days there are arrivals of more than 80,000 boxes of pink tomatoes daily, the "Second Restriction" will be applied.

Art. 10. The Commission, in order to apply the restrictions should consider jointly the minimum prices and volumes. For example, up to the last day of January restrictions can be applied when on three consecutive days the arrivals are equal to or greater than those indicated by Article 9, Clause a, or whenever sales prices are equal to or smaller than those indicated in Article 8, and similarly during the other period, in agreement with the volumes indicated.

Art. 11. The two restrictions referred to in Article 9 are the following:

The "First Restriction" includes increase of inspection to 80% and the suspension of packing, shipping and crossing of pink tomatoes for the sizes 4X5 and larger, 7X7 and smaller, or the equivalents.

The "Second Restriction" includes an increase in inspection to 80% U. S. ONES and the suspension of packing, shipping and crossing of ripe tomatoes in the 6X6, 2-layer size, permitting the crossing of only the 5X5 and 5X6, 2-layer sizes and the 6X6 and 6X7, 3-layer sizes and will go in force when the prices and arrivals reach the figures established in Articles 8 and 9, respectively, of this Regulation.

Art. 12. The total halt of packing and shipping will be obligatory, following the prohibition of the crossing of pink tomatoes when after having applied the restriction methods mentioned above, the prices remain for three consecutive days at \$2.25 or less F.O.B. Nogales, Arizona for 6X6 and 6X7, 3-layer boxes and at \$2.00 or less F.O.B. Nogales, Arizona for 5X5 and 5X6, 2-layer boxes.

In no case will there be a total halt if the first two restrictions have not been applied.

Art. 13. The basis for the resumption of crossings of the 7X7 size shall be a price for the next largest size (6X7), for 3 consecutive days, \$0.75 above the minimum stipulated in the Regulation. In the case of the sizes 4X5 and larger, the renewal of crossing will be automatic following the renewal of the small sizes.

Art. 14. After the Commission resolves to cancel a restriction or a total halt, packing will be immediately authorized, but arrivals and crossings should be made 24 hours after the resolution, it being understood that the Commission shall not be able to continue a total halt for more than 72 hours.

Art. 15. After a total halt, crossing of the sizes that remain free after the application of the second restriction will be permitted, and as the market begins to react favorably in price and when the volume of arrivals does not surpass the maximum figures considered in this regulation, the shipments of the larger and smaller sizes will be permitted, following the inverse order from that of the restrictions.

Article 16. The Associations are obligated to advise their members immediately of the resumption of packing.

#### "Green Tomatoes"

Art. 17. In order to apply restrictions, the minimum prices for green tomatoes will be: \$2.00 F.O.B. point of embarkation for a standard 30 lb. box and \$2.25 F.O.B. point of embarkation for a 40 lb. wirebound crate or carton, or the equivalent price for any other authorized type of container with larger or smaller weight.

Art. 18. The restrictions will also be applied on the basis of the number of freight cars arriving daily in Nogales, reported officially by the Commission and in agreement with the following:

(a) From November 15 to the last day of January, when the number of freight cars arriving daily on three consecutive days exceeds 20, the "First Restriction" should be applied, and when the number of freight cars arriving in Nogales on three consecutive days exceeds 30, the "Second Restriction" will be applied.

(b) During the month of February when more than 30 freight cars arrive daily for 3 consecutive days the "First Restriction" will be applied and when more than 40 cars arrive daily for three consecutive days the "Second Restriction will be applied."

(c) In the month of March when the number of daily arrivals for three consecutive days exceeds 40 cars, the "First Restriction" will be applied, and when more than 50 cars arrive daily for three consecutive days the "Second Restriction" will be applied.

(d) From the first of April to the end of the season when for three consecutive days more than 25 cars arrive daily, the "First Restriction" will be applied and the "Second Restriction" will be applied when for three consecutive days the number of cars arriving in Nogales exceeds 35 daily.

Art. 19. The "First Restriction" consists of the prohibition of packing, shipping and crossing of green tomatoes in the 7X7 and smaller sizes and in the increase of minimum inspection to 85% U. S. ONES.

The "Second Restriction" consists of the prohibition of packing, shipping and crossing of the 5X5 and larger sizes, permitting only the crossing of the 5X6, 6X6 and 6X7 sizes.

Art. 20. If after having applied the restrictions referred to in the foregoing article, prices continue for three consecutive days at less than \$1.75 (U. S.) for a standard box and \$2.00 (U. S.) for a 40 lb. wirebound crate or cardboard carton, or the equivalent price by weight for other authorized types of containers, there will be a total halt, prohibiting the packing, shipping and crossing of green tomatoes.

Art. 21. The resumption of crossings after a total halt will begin with the packing, shipping and crossing of green tomatoes in the 5X6, 6X6, and 6X7 sizes. Provided that the market price reacts favorably, crossing will be permitted for other sizes in the inverse order from that indicated in the restrictions.

Art. 22. The shipping of pink or green tomatoes in the 7X8 size or smaller sizes or the equivalent will continue to be prohibited; this can only be authorized in special cases, that is, when conditions of production and market make it advisable and there is previous agreement from the specialized Assembly of Vegetable Growers of CAADES.

#### "Obligations and Sanctions"

Art. 23. In addition to the obligations indicated in this regulation, the producer is obliged to authorize his packing manager to receive in his absence the notifications of restrictions on packing, shipping and crossing, and in this way the packing manager, as the representative of the proprietor, is obligated to comply with the demands of the restrictions. In other words, the owner of the packing house will not be able to claim ignorance of the notifications when they have been received by his packing manager or by someone else that he has authorized for this purpose.

Art. 24. The producers dedicated to vegetables should register in the agricultural organizations to which they belong and register the labels that they are going to use for export as well as for national consumption, with the understanding that the latter should specify that they are for national consumption.

Art. 25. The Associations of Agriculturalists should send to the National Union of Horticultural Producers a listing of the producers and the labels registered with each of them so that the said Union will not issue the Certificate of Origin and Embarcation Guide for the crossing of shipments of unregistered persons and labels.

Art. 26. Field packing of tomatoes for national consumption continues to be positively prohibited; in other words, the tomato sold for national consumption must be packed exclusively in the packing house.

Art. 27. The grower who violates any of the articles of this Regulation referring to the prohibition of sizes will be sanctioned with a fine of 10,000.00 pesos and, in case of

tomato crossings and arrivals that violate any of the restrictions, in addition to the foregoing sanction a further fine of 10.00 pesos per package. Repetition of the offense will be punished by the fines mentioned and the total suspension of shipment for 7 days. The quantities collected through these fines will go to the fund of the association to which the violator belongs. In order that the commission can apply the fine per package, it is authorized, in case of finding a package of prohibited size in a shipment to unload the trailer or freight car and apply the corresponding sanctions. The grower who ships tomatoes without the required inspection will not merit a fine but will be refused crossing.

Art. 28. The commission will draw up and execute a certificate indicating the violations, specifying the amount of the fine and citing the concern or his representative who should sign the certificate. In the case he refuses, the commission will record this fact. The National Union of Horticultural Producers should deny Certificates of Origin and Embarcation Guides to the grower who does not pay the proper sanction, after the passage of a month beyond the date when the fine was set. The original certificate must be sent to the National Union of Horticultural Producers, a copy to CAADES, another to the association to which the sanctioned grower belongs, and another copy will be retained by the Commission for its files.

#### "Packing"

Art. 29. In order for the National Union of Horticultural Producers to draw up the Certificates of Origin and Embarcation Guides, the producers that export vegetables should comply with the standards specified in this regulation.

Art. 30. It is prohibited to ship vegetables in bulk with the exception of watermelons, therefore all the growers that want to export vegetables to wholesale buyers should select them and ship them in suitable containers within the agricultural zone where they were produced.

Art. 31. The containers that are authorized for exportation are the following:

#### Green Tomato

1. Standard wooden box for three, three and one-half, and four layers, depending on the size.
2. Cardboard carton holding 40 lbs.
3. Wire-bound crate with capacity of 40 to 60 lbs.

#### Pink Tomato

1. Wooden box holding 2 and 3 layers (Indio flat) of tomatoes, accommodating various sizes, excluding the 7X8 and smaller sizes which can be packed in 4-layer boxes.
2. Cardboard carton holding 20 lbs. of tomatoes, selected for color and size.
3. Cardboard carton of 2 and 3 layers.

#### Caribe, Fresno and Anaheim Peppers

1. Wire-bound crates for 1 bushel and 1 1/9 bushel.
2. One-bushel cardboard carton.

3. Wooden box holding one bushel.

#### Bell Peppers

1. Wooden pepper box nailed or wire-bound.
2. Cardboard carton.

#### Cucumbers

1. Wire-bound crates of 1 bushel and 1 1/9 bushel.
2. Wooden basket of 1 bushel.
3. Standard-type, wooden box with depth of 7 3/4 inches or smaller.
4. Cardboard carton holding 24 cucumbers.

#### Eggplant

1. Standard wooden box with depth of 7 3/4 inches.
2. Wire-bound crate.

#### Green Beans

1. Wire-bound crate.
2. Wooden green bean crate.
3. Standard wooden box with depth of 7 3/4 inches or smaller.

#### Cherry Tomato

1. Cherry box with 12 plastic or cardboard baskets.
2. Two-layer, cherry-type, wire-bound crate.

#### Squash

1. Standard wooden box with depth of 5 3/4 inches.

#### Peas

1. Wire-bound crates of 1 bushel and 1 1/9 bushel.
2. Wooden, 1-bushel pea basket.
3. Standard, wooden box with depth of 7 3/4 inches or less.

#### Cantaloup

1. Standard and jumbo melon crates approved by "El Ferrocarril del Pacifico, S.A. de C.V." (Pacific Railroad).

## Green Sweet Corn

1. Wired corn crate accommodating ears by dozens.
2. Wooden corn crate accommodating ears by dozens.
3. Cardboard carton.

Art. 32. Packages authorized for national consumption are:

### Tomato

1. Standard wooden crate with capacity of 30 kgs.

## APPENDIX V

### Increase in Average Price Required to Maintain Industrial Revenue Under Managed Marketing

Under restrictive marketing a certain revenue loss (DR) would occur from withholding part of supply. Let DR be the present expected revenue from the portion of supply to be withheld from market and R be the total expected revenue from nonrestricted marketings, i.e., from the total present supply.

$$\text{Require that DR} = a \bar{P}_2 B Q$$

Where  $a$  = the proportional increase in the average price of the remaining portion of supply needed to maintain revenue.

$\bar{P}_2$  = the present expected average price of the portion of supply to be marketed.

and  $B$  = the proportion of total supply to be marketed.

and  $Q$  = total supply.

$$\text{Also set DR} = S_1 R$$

where  $S_1$  = the proportion of revenue lost (that is to be recovered).

$$\text{Now if DR} = a \bar{P}_2 B Q \text{ then } \frac{DR}{\bar{P}_2 B Q} = a = \frac{S_1 R}{\bar{P}_2 B Q}$$

But  $\frac{R}{Q} = \bar{P}_1$  the original average price of total supply.

$$\text{Therefore } \frac{S_1 R}{\bar{P}_2 B Q} = \frac{S_1 \bar{P}_1}{B \bar{P}_2} = a$$

$$\text{Knowing } \bar{P}_1 = \frac{S_1 R + S_2 R}{Q}$$

where  $S_2$

= the present expected share of total revenue from the portion of supply earmarked for marketing, and from previous notation:

$$\bar{P}_2 = \frac{S_2 R}{BQ} \text{ or } B \bar{P}_2 = \frac{S_2 R}{Q}$$

$$\text{it follows that } \frac{\bar{P}_1}{B \bar{P}_2} = \frac{S_1 R + S_2 R}{Q} \cdot \frac{Q}{S_2 R}$$

$$= \frac{(R - S_2 R) + S_2 R}{S_2 R}$$

$$= \frac{R}{S_2 R} \text{ or } \frac{1}{S_2}$$

Therefore substituting in

$$a = \frac{S_1 \bar{P}_1}{B \bar{P}_2} \text{ gives}$$

$$a = \frac{S_1}{S_2} \text{ the required proportional}$$

increase in  $\bar{P}_2$  to recover revenue lost from withholding part of supply.

Note: The smaller  $S_1$ , the present expected revenue loss, the nearer it approximate the actual necessary price increase of the remaining supply to maintain revenue.